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A. D. MELVIN, CHIEF OF BUREAU.

PROCEEDINGS OF A CONFERENCE OF FEDERAL
AND STATE REPRESENTATIVES

TO CONSIDER PLANS FOR

THE ERADICATION OF THE CATTLE TICK,

HELD AT

NASHVILLE, TENN., DECEMBER 5 AND 6, 1906.



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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
BUREAU OF ANIMAL INDUSTRY,
Washington, D. C., January 15, 1907.

SIR: I have the honor to transmit herewith a report of the proceedings of a conference of Federal and State representatives which was held at Nashville, Tenn., December 5 and 6, 1906, to consider plans for the eradication of the cattle tick. The papers and discussions have an important bearing on the work now in progress by cooperation between this Department and the authorities of certain States for the extermination of the tick which spreads Texas fever of cattle, and it is desirable to disseminate this information among the people of the affected sections of the country. I therefore recommend the publication of the report as Bulletin No. 97 of this Bureau. For the sake of brevity the proceedings have been somewhat condensed.

Respectfully,

A. D. MELVIN,
Chief of Bureau.

HON. JAMES WILSON,
Secretary of Agriculture.



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PROCEEDINGS OF A CONFERENCE OF FEDERAL AND STATE REPRESENTATIVES TO CONSIDER PLANS FOR THE ERADICATION OF THE CATTLE TICK.

ORGANIZATION.

The meeting convened in the Federal Building, Nashville, Tenn., December 5, 1906, at 10.15 o'clock a. m.

Dr. A. D. Melvin, chief of the Bureau of Animal Industry, United States Department of Agriculture, Washington, D. C., called the meeting to order and asked for nominations for chairman and secretary.

Mr. R. F. Wright, assistant commissioner of agriculture of Georgia, Atlanta, Ga., was elected chairman, and Dr. W. P. Ellenberger, inspector of the Bureau of Animal Industry, Nashville, Tenn., was elected secretary.

REMARKS BY THE CHAIRMAN.

Mr. WRIGHT. I hope to have your hearty cooperation in the discharge of the duties of the important position to which you have elected me. We consider that no work in which the people of our grand country are engaged is more important than that of tick eradication, Six or eight years ago, in Georgia, we took this work under consideration, and with a little \$500 appropriation we worked five or six long years and finally eradicated the tick from three counties. Since our National Bureau of Animal Industry, of which Doctor Melvin is chief, has taken charge of the work and given us some assistance, we have practically eradicated the ticks from seven counties of Georgia, and I think Doctor Payne, who has had the work in charge, will recommend three counties to be placed above the quarantine line provisionally. With a few exceptions, our people have taken hold of this work smoothly and systematically, and have allowed us to work straight through. They have given us their aid and cooperation. Doctor Payne soon organized his forces and got the work in good shape, and I am satisfied that in a year from now, say by the 1st of next August, six or seven of these counties will be ready to be placed above the national quarantine line; at least we hope so. But I would like to state that I think it would be a mistake to prematurely withdraw the forces from the States or from the counties in which they are now engaged. It may be that the appropriation has grown very small, and perhaps it

will be wise to curtail the number of inspectors in our State. We have 10 or 12, I believe, but we would not be satisfied for the Bureau of Animal Industry to leave us until we learn to stand alone and to walk a little. If you remove these inspectors now, we can not expect to find things in good condition when we resume work next spring. On the other hand, if you give us an inspector for two counties and let him look them over during December, January, February, and March, we can still hold those counties in check.

We need a large appropriation. Our legislature had adjourned prior to last August when we began this work in Georgia. Owing to the great multiplicity of work before our State at that time, and the number of appropriations, and the confusion of a hot gubernatorial contest, the legislature did not make an appropriation; but I will assure the Department that next summer Georgia will come forward with a good appropriation to help this tick eradication work. A number of citizens of towns just below the tier of counties in which our work has been done have petitioned us to come down and see them. They are getting interested in the work. I am satisfied with the work which the Bureau of Animal Industry has done already. The greatest difficulties that are to be overcome in tick eradication in Georgia have been encountered in the manor districts where there is free pasturage and no stock laws. It was hard to manage them, and we have had a lot of trouble; but most of the counties still lower down have stock laws, and it will be much easier to eradicate the tick there.

I now declare this meeting ready for business.

PERSONS PRESENT.

The roll of States was called, and the following responded:

Alabama: C. A. Cary, professor of veterinary science, State Agricultural and Mechanical College, Auburn.

Arkansas: W. Lenton, veterinarian to State Agricultural Experiment Station, Fayetteville.

California: Charles Keane, State veterinarian, Sacramento.

Florida: C. F. Dawson, veterinarian to State board of health, Lake City.

Georgia: R. F. Wright, assistant commissioner of agriculture, Atlanta; C. L. Willoughby, dairy and animal husbandman, State Agricultural Experiment Station, Experiment.

Kentucky: F. T. Eisenman, State veterinarian, Louisville.

Louisiana: Wilmon Newell, secretary State crop pest commission, Baton Rouge; C. E. Mauldin, inspector, Bureau of Animal Industry, New Orleans.

Missouri: D. F. Luckey, State veterinarian, Columbia.

North Carolina: Cooper Curtice, inspector, Bureau of Animal Industry, Raleigh (representing State department of agriculture by request).

Oklahoma: Thomas Morris, secretary live-stock sanitary commission, Guthrie.

South Carolina: L. A. Klein, veterinarian to State Agricultural Experiment Station, Clemson College.

Tennessee: H. A. Morgan, director of State Agricultural Experiment Station, Knoxville; R. H. Kittrell, State live-stock commissioner, Murfreesboro; Zach. Biggs,

deputy State live-stock commissioner, Trenton; John T. Goodrich, deputy State live-stock commissioner, Fayetteville.

Texas: J. W. Parker, inspector, Bureau of Animal Industry, San Antonio (representing State live-stock sanitary commission by request).

Virginia: John Thompson Brown, chairman State board of control, Brierfield; E. J. Harrison, Cumberland.

The Bureau of Animal Industry, United States Department of Agriculture, was represented by the following:

A. D. Melvin, chief of the Bureau.

R. P. Steddom, chief of the Inspection Division.

B. H. Ransom, chief of the Division of Zoology.

Cooper Curtice, inspector in charge of Virginia and North Carolina.

A. J. Payne, inspector in charge of South Carolina and Georgia.

W. P. Ellenberger, inspector in charge of Kentucky, Tennessee, Alabama, and Mississippi.

Albert Dean, live-stock agent in charge of Arkansas, Texas, and Oklahoma.

C. E. Mauldin, inspector, New Orleans, La.

Joseph W. Parker, inspector, San Antonio, Tex.

E. M. Nighbert, inspector, Georgia.

Willis B. Lincoln, inspector, Nashville, Tenn.

George P. McCabe, Department Solicitor.

ORDER OF BUSINESS.

Doctor KEANE. I think the object of this meeting should be stated. It affects the whole southern portion of this country, and we should have a regular order of business. A committee on resolutions should be appointed by the chair and a programme of reports from the different States and the Bureau inspectors should be made out. I move that the chairman appoint a committee of five on resolutions.

The motion was seconded and passed, and the chairman appointed the following committee: Thomas Morris, Charles Keane, L. A. Klein, H. A. Morgan, J. Thompson Brown, and D. F. Luckey.

A motion by Mr. McCabe, seconded by Professor Willoughby, that a committee of three on order of business be appointed by the chair, and that the meeting take a recess of fifteen minutes in order to give that committee time to report, was adopted. The chairman appointed George P. McCabe, Wilmon Newell, and R. P. Steddom.

The committee on order of business submitted the following report, which was adopted:

1. Committee on resolutions to report, the report to be considered at any time.
2. Remarks by Dr. A. D. Melvin on "The work of tick eradication from the standpoint of the Bureau of Animal Industry." Fifteen minutes.
3. Report of Dr. R. P. Steddom on the work of tick eradication which has been accomplished to date. Fifteen minutes.
4. Prof. H. A. Morgan on "Disinfection of cattle and premises." Fifteen minutes. General discussion, thirty minutes, each speaker limited to three minutes.
5. Mr. George P. McCabe, "The legal side of the tick-eradication problem." Fifteen minutes. Discussion, thirty minutes; three minutes to each speaker.
6. Dr. D. F. Luckey, "Cooperation between the States and the Federal Government." Fifteen minutes. Discussion, thirty minutes; three minutes to a speaker.

7. Hon. Thomas Morris, "Enforcement of quarantine regulations." Fifteen minutes. Discussion, thirty minutes; three minutes to a speaker.
8. Dr. C. A. Cary, "Educational and publicational work."
9. Reports of State representatives, five minutes to a man.

(Signed)

GEORGE P. McCABE,

WILMON NEWELL,

R. P. STEDDOM,

Committee.

The CHAIRMAN. Unless there is objection, this report will be considered adopted, and it will be the order of business, unless otherwise changed by the meeting. Remarks by Doctor Melvin are now in order.

THE WORK OF TICK ERADICATION FROM THE STANDPOINT OF THE BUREAU OF ANIMAL INDUSTRY.

By A. D. MELVIN, *Chief of the Bureau.*

MR. CHAIRMAN AND GENTLEMEN: I feel that this meeting is of the greatest importance, because it represents one of the greatest movements ever started for the betterment of the live-stock interests in the South. The deliberations of this body should carry a great deal of weight in outlining our future work. The work that we have done during the past years and are now doing has, I think, progressed sufficiently to show that tick eradication is practicable, and, considering the work that has been done, it is not expensive. It is very cheap, indeed, compared with the results and benefits that will be derived from it. Probably we ought not to be too sanguine as to our future progress, because the portions of territory that we have commenced upon will naturally be those that will be the easiest cleaned of infection. At the same time I do not think that we should be pessimistic; in fact, I am very optimistic over what we have done.

Before Congress took any action in making an appropriation for this specific purpose, I commenced to outline our future work. Doctor Steddom, as chief of the Inspection Division of the Bureau, was assigned to this work and nearly all of his other duties were assigned to others in order that this could have his undivided attention; and the carrying on and outlining of this work has been the greatest part of his work during the past year.

At the same time, through our Solicitor, we took up with the various States the question of legislation. This will be dwelt upon quite fully by Mr. McCabe. It was necessary for us to know what each State could do in the way of cooperation, as we could not do anything beyond regulating interstate shipments except through cooperation with the State boards. Some of the States had insufficient laws and some had no laws whatever to assist us; but we took advantage of everything there was and made the most of it, and we have gone ahead

that way. But before we can make very great progress in some States, different legislation will be necessary.

Besides this legislation, each State should do all it can in the way of appropriation. I feel that the General Government must bear the greater part of these expenditures, but each State should do all within its power in the way of providing funds to assist, because the more money we have judiciously expended, the sooner we will get through with the work and the less the delay will be. The shorter the time in getting their farms and neighborhoods free, the less opposition we are going to have from the people. If for any reason it should be necessary to let the work drag along for several years, the people will become impatient and discouraged, and we will lose their support, which we must have, at least to a very great extent, to be successful.

The question of inspectors was one that embarrassed us a great deal, as in addition to this tick work we had the enormous meat-inspection work, which was provided for by Congress at the last session and which includes all slaughtering establishments or meat-curing establishments which do an interstate business, the only exceptions being retail dealers, butchers, and farmers. From having 150 establishments under inspection our service was increased to include more than 650 establishments, and instead of a force of something over 800 employees on meat inspection, we now have over 2,000. In order to extend this work it was necessary to scour the country for the necessary men. We were, and still are, lacking in number of veterinarians, and for this reason we could not supply for the work of tick eradication as many, and not always as experienced, inspectors as we desired. The States have assisted us considerably and we have been able in many cases to appoint State inspectors and pay their salaries. I think that the employment of many of those inspectors was a very wise thing, because they had the confidence of the people with whom they came in contact, and were efficient; but great care must be taken in the selection of all our inspectors. The mistake of one inspector or the carelessness or the indifference of another can reflect upon the work of all of them to some extent. People are inclined to charge the mistake of one individual to the whole force.

In addition to having efficient inspectors, we must try as far as possible to adopt certain rules and regulations upon which to proceed, and strictly enforce these regulations. The experience that I have had in all of our work has been that to have any favorites is a mistake. As far as possible, all individual cattle owners must be treated alike, circumstances and conditions being considered.

We have employed, besides the regular inspectors and persons located in the States whom we employed as inspectors, several others to visit and attend various live-stock meetings, in order to address them upon tick eradication, and not only instruct the people as to

what we intend to do and could do, but, as far as possible, to create and encourage an enthusiasm for this work. We have had a number of these gentlemen and I believe that their work has been very beneficial. It is necessary for all who are engaged in this work to familiarize themselves thoroughly as possible with the subject and to talk tick all the time and never forget about it. Wherever you get a chance, where possible good may come, talk about the subject and keep it alive.

The work that we have done, as indicated in the reports that we have received from our various inspectors, contemplates the releasing of a territory of something like 50,000 square miles. This is an immense area and includes territory in nearly all the States. It is an area, as the Secretary states in his report, larger than the State of Virginia. I think that we should feel very much gratified at having accomplished such a tremendous work in the comparatively short time of five months. Some of this territory may not be clean; we may still have to hold some of it in quarantine. But with such a showing as that I think we can go to Congress with assurance and ask for a larger appropriation in order that this work can be continued; and I believe that if we get the proper support we will make a greater showing next year than we have this year.

I came for the purpose of meeting you gentlemen, hearing from you regarding the work in your various localities, and seeing it from your point of view. Of course, we in Washington may have different ideas, and for this reason I desire to hear each one of you express himself.

REPORT OF COOPERATIVE WORK ON TICK ERADICATION.

By R. P. STEDDOM,

Chief of Inspection Division, Bureau of Animal Industry.

MR. CHAIRMAN AND GENTLEMEN: This is a report of the work up to October 31, 1906, submitted to the Secretary of Agriculture.

Under the provisions of the act of Congress approved June 30, 1906, appropriating \$82,500 to enable the Secretary of Agriculture to undertake experimental work in cooperation with State authorities in eradicating the ticks transmitting southern cattle fever, the Department has for some months past been assisting the States and Territories from California to Virginia along these lines. Anticipating the action of Congress, an investigation was made respecting the laws of the various States, and through the various attorneys-general inquiry was made relative to the existence of State laws under which the Government could undertake the work of tick eradication. It was found that, while some State laws afford ample provisions, other States either have no law bearing on the subject or the statutes are inadequate. The following table shows the particular points

covered by the investigation and the general trend of the information received:

Provisions of State and Territorial laws relating to live-stock quarantine and sanitation.

State.	Questions and answers.			
	Are local officers authorized and empowered to enter premises to inspect live stock and enforce quarantine, including counties, districts, farms, and ranches, and to control the movement of live stock?	Are such officers empowered to enforce such disinfection of animals and premises as may be necessary?	Are State officials authorized to issue rules and regulations establishing and maintaining quarantine lines?	May the State confer authority upon Federal representatives to act as officials of the State in such matters?
Alabama.....	No live-stock quarantine or sanitary law.	No.....	No.....	
Arkansas.....	Peace officers may enforce quarantine lines fixed by law and by the United States.	No.....	No.....	
California.....	Yes.....	Impliedly.....	Yes.....	As county officials only.
Florida.....	No live-stock quarantine or sanitary law.			
Georgia.....	Yes; impliedly so.....	Yes.....	Yes.....	Not prevented.
Indian Territory.....	No law to cover these matters.			
Kentucky.....	Yes.....	Yes.....	Yes.....	Yes.
Louisiana.....	Yes; impliedly so.....	Yes.....	Yes.....	No.
Mississippi.....	No live-stock quarantine or sanitary law.			
Missouri.....	No.....	No.....	No.....	No.
North Carolina.....	Yes.....	No.....	Yes.....	Yes.
Oklahoma.....	Yes.....	Yes.....	Yes.....	Yes.
South Carolina.....	No law to cover these matters.			
Tennessee.....	Yes.....	Yes.....	Yes.....	Not prevented.
Texas.....	Yes.....	Yes.....	Yes.....	No.
Virginia.....	Yes.....	Yes.....	Yes.....	Yes.

The matter was early taken up with the proper officials in the States and Territories interested, and arrangements were made for the Department to cooperate with them to the extent that their respective laws would permit. Under these arrangements the work has been done in close cooperation with the local authorities, who were permitted to designate the counties or localities to be covered and to recommend for appointment as agents of the Bureau men acquainted with the local conditions in the respective localities.

The territory in which it was desired to operate was divided into five sections, as follows:

1. California.
2. Texas, Oklahoma, Missouri, Arkansas, and Louisiana.
3. Kentucky, Tennessee, Alabama, and Mississippi.
4. Georgia and South Carolina.
5. Virginia and North Carolina.

The work was organized as soon as possible after the passage of the law, but it was late in July before it could be begun at all, and even later before it could be taken up in some sections.

As the conditions in the different sections were widely divergent, the plans of procedure and methods employed necessarily varied greatly. In some States meetings were held, at which the subject of tick eradication was discussed with farmers, stockmen, and other

interested citizens. These meetings were intended to be largely educational, but they gave an opportunity to petition State authorities for relief and to express preference for local inspectors, thus developing an enthusiasm and interest that can only come from a close personal identification with an enterprise of this sort. In some places it was necessary to employ inspectors who could live in the saddle and wield a lasso like a cowboy. These men worked in groups of about a dozen, each group having a cook and a camping outfit. They covered their territory systematically, roping and examining cattle wherever found, and informing the owners of infested animals of the most practical method of getting rid of the ticks. It was found advisable to buy a carload of crude petroleum (in barrels) for use in the treatment of infested animals. This oil was distributed and used under the immediate supervision of inspectors of the Bureau in the Southeastern States, and was doubtless the means of doing what could have been done in no other way, as the crude oil is difficult to obtain in small quantities and at points far distant from its production.

The following table shows by States the number of herds inspected (except in North Carolina and Virginia), the number of cattle inspected, the number found free of ticks, and the number found to be infested, a grand total of 548,844 cattle having been inspected:

Statement of inspection work to October 31, 1906.

State.	Inspections.				Number of counties.
	Herds.	Cattle.			
		Free.	Infected.	Total.	
Alabama.....	780	4	5,550	5,554	2
Arkansas.....	1,527	6,671	2,332	9,003	2
California.....	1,015	67,517	58,889	126,406	11
Georgia.....	4,474	10,053	6,365	16,418	7
Kentucky ^a	4,077	13,653	7,332	20,985	4
Missouri.....	126	3,000	1,430	4,430	3
North Carolina.....		7,203	1,632	8,835	3
Oklahoma.....	10,589	97,860	16,972	114,832	5
Tennessee ^b	6,317	23,204	15,840	39,044	17
Texas.....	410	86,682	99,175	185,857	17
Virginia.....		12,217	5,263	17,480	11
Total.....	29,315	328,064	220,780	548,844	82

^a In addition, in Kentucky 1,396 herds and 6,904 cattle were reinspected.

^b In addition, in Tennessee 822 herds and 4,174 cattle were reinspected.

The work is still progressing in some States, but will have to be discontinued about December 1 on account of the lack of funds.

THE WORK BY STATES.

Following is a résumé of the work done and the results accomplished in each State to October 31. The outlook for next season's operations, as expressed in recent reports from the men in charge of the different sections, is also touched upon.

California.—The work, covering the inspection of 1,015 herds containing 126,406 head of cattle, has been done by eight veterinarians and one agent, and was confined largely to the counties below the quarantine line from which shipments have been permitted after inspection, viz, San Luis Obispo, Madera, Fresno, Kings, Tulare, Kern, and Merced. Some work was also done in Santa Barbara County. Herds known by local authorities to be infested were first located and inspected; then herds adjacent to these were carefully inspected, the aim being to locate and quarantine as quickly as possible all infested herds. These are now being disinfected, and it is expected that with continued work along the lines followed during the past few months the counties of Merced, Madera, Fresno, Kings, Tulare, and Kern may be released from quarantine before the close of the present fiscal year, and that the counties of Santa Barbara, Ventura, Los Angeles, and San Bernardino may be placed within the provisionally quarantined area. This will be the more easily and more certainly accomplished if, as is hoped and expected, the next legislature of California enacts a more satisfactory law and makes a specific appropriation of funds to be used in connection with the Department in tick eradication work.

Texas.—On account of the lack of funds the State authorities were unable to employ men who could give their time to the experimental work in Texas, but the regular State inspectors were directed to co-operate with the Bureau to the extent that their other duties would permit. The work was not begun until the end of August, but great interest was shown in some sections, one man—the manager of a large estate—offering \$50,000 on condition that the work be undertaken in his county and with the understanding that his cattle might be given an unrestricted northern market. Eleven Bureau employees were engaged in the work in seventeen counties, and their reports show the inspection of 410 herds containing 185,857 head of cattle. The indications are that by the end of the present fiscal year the counties of Childress, Hardeman, Wilbarger, Cottle, Foard, King, Stonewall, Borden, Howard, Glasscock, and Pecos will be so free from general infection that they may be removed from the provisionally quarantined area.

Oklahoma.—The governor of Oklahoma and the officers of the live-stock sanitary commission gave hearty support and assistance to Bureau employees in that Territory. The laws are favorable, the stock interests are large, and the necessity for aggressive work looking to tick eradication is keenly felt. A farm-to-farm inspection was made, and wherever infested animals were found the owner was instructed as to the best and most practicable method of treating the trouble. The plan, which was different from that followed in any other section, was, briefly stated, as follows:

Both local and Federal inspectors were experienced in the saddle and able to rope and confine a suspicious animal wherever found, either on the open ranch or in pastures, and make a careful examination for ticks. These men traveled by twos from ranch to ranch, locating all infected cattle and premises. At the close of the day instead of returning to town or even going to a ranch house they went to their own camp, which had been moved forward a convenient distance during the day. Twelve men and a cook were usually with a single camp outfit, and in this way they covered the country in a systematic manner. They were followed a few days later by an inspector whose business it was to see that the work of disinfection was being properly carried on.

As the laws provide that where the owner refuses to accomplish disinfection the same may be done by the sheriff, and the cattle be sold to cover the costs, it was comparatively easy to enlist cooperation of owners of infested herds. Seventeen Bureau employees and a number of local inspectors were engaged in the work in Oklahoma, and accomplished the inspection of 10,589 herds containing 114,832 head of cattle; and while but one county, Greer, is to be at once placed within the provisionally quarantined area, yet an immense amount of good work was done in other counties, and it is expected that by the end of the present fiscal year the counties of Payne, Logan, Oklahoma, Cleveland, and Canadian may be ready to be released from quarantine.

Missouri and Arkansas.—Southwestern Missouri and northwestern Arkansas, lying contiguous to the infected area of the Indian Territory, have themselves become infected, and some work was done in five counties in that section. Three men report the inspection of 1,653 herds containing 13,433 head of cattle.

Louisiana.—On July 13, 1906, a Bureau inspector was directed to make a general survey of the conditions with a view to ascertaining what work in the line of tick eradication might be attempted in Louisiana. The meat-inspection work at New Orleans prevented him from making the investigation until late in September. He reports to the effect that whatever is done there will have to be done in connection with the crop pest commission, which at present is not in favor of enforcing the quarantine of infected live stock and premises. He recommends the liberal distribution of literature for educational purposes, and this is now being done, 2,000 copies of Farmers' Bulletin No. 261 having been sent to the crop pest commission for distribution at the State fair.

A Bureau inspector has been instructed to make a thorough investigation of the Gulf country of Louisiana, as it has been represented that sections of it are free from fever ticks. If the report of his investigation bears out the representations that have been made, the nec-

essary steps will be taken to permit the shipment of cattle from such sections without restrictions.

Representatives of the Bureau have recently attended a meeting of the Association of Official Entomologists of the Cotton Belt, at Baton Rouge, at which the subject of tick eradication was discussed. Since their return from that meeting one of them states that, when the cattle owners desire, Louisiana will be an easy State to clean up, as the cane fields offer especial advantages.

Tennessee.—Plans for a division of the work in Tennessee were agreed upon by a representative of the Bureau and the State live-stock commissioner, the counties covered by the deputy State inspectors to be finally investigated by Bureau inspectors with a view to their exemption from quarantine. Thirteen Bureau employees were engaged in the inspection work, and an additional man was employed, who visited twenty-two counties, conferred with county boards, addressed twenty-four meetings on the subject of tick eradication, and through the county press brought the subject to the attention of the general public.

The results have been most encouraging, as according to recent reports and recommendations the counties and parts of counties mentioned below may now be removed from the quarantined area: The counties of Moore, Cannon, and Cumberland; about one-third of each of the counties of Haywood, Fayette, and Coffee; about two-thirds of each of the counties of Madison and Jackson; about one-half of each of the counties of Clay and Dekalb, and a small portion of each of the counties of Franklin, Putnam, and Fentress. These sections are not entirely free from ticks, but the infested animals are few and are controlled by the State and county authorities under agreement with the Bureau, so that their proper treatment may be carried to completion without danger of spreading the parasites. Up to the end of October, 6,317 herds, containing 39,044 head of cattle, had been inspected, 822 herds of which, containing 4,174 head of cattle, were reinspected.

Kentucky.—For some years past it has been necessary to include within the provisionally quarantined area a few counties in southern Kentucky lying contiguous to some of the infected counties of Tennessee. The number so included had been reduced to two counties, Clinton and Wayne; but slight infection was also found in two adjoining counties. The entire matter was taken up with the State board of health, and that body on August 1, 1906, issued a proclamation placing a quarantine upon these counties and conferring upon the employees of this Bureau the authority of sanitary inspectors of the State board of health. Under this arrangement the counties were thoroughly covered, with the result that it is now recommended

that they be removed from the provisionally quarantined area. This work was done by seven Bureau employees and included the inspection of 4,077 herds containing 20,985 cattle, and the reinspection of 1,396 herds containing 6,904 cattle. Under agreement with State and county authorities, the remaining infested animals and premises will be kept under quarantine until disinfection is complete.

Alabama.—In Alabama the work was largely of an educational character, instructing owners of cattle regarding the work of tick eradication and methods of disinfection. The work was done by three Bureau employees in two of the northern counties, Limestone and Madison, and included the inspection of 780 herds containing 5,554 head of cattle. The infection in these counties is general, and while there is no State law under which effective work can be done, the people are so alive to the situation and gave such cordial support to the work that there is reason to believe that permanent results may be accomplished if the work can be resumed early in the spring of 1907.

Georgia.—The work in Georgia has been confined to seven counties in the northeastern part of the State, as follows: Stephens, Habersham, White, Dawson, Pickens, Gilmer, and Fannin. It was at first largely educational and met with the hearty approval and cordial support of farmers, stock owners, and others interested. In addition to the educational work the thirteen Bureau employees engaged inspected 4,474 herds containing 16,418 cattle, and, while the percentage of infection is very high in some of these counties, in three—Stephens, Habersham, and White—it is so low, and the work of disinfection is progressing so well, that they can probably be placed within the provisionally quarantined area before the close of the present fiscal year. It appears that a large majority of the better and representative citizens of the counties covered have contributed their support to the work, and that if work can be resumed early in the spring of 1907 a number of other counties may be either added to the provisionally quarantined area or entirely released from quarantine.

North Carolina.—The cooperative work in North Carolina has been with the State board of agriculture, through its veterinarian and seven inspectors, the Bureau force averaging four inspectors and three agents. Meetings for the discussion of the question of tick eradication have been held, infested herds have been located and quarantined, and other preparations made that will facilitate an intelligent resumption of the work in the early spring. The farm-to-farm inspection was made in three counties, and the inspection of quarantined farms was made in six other counties. The total number of cattle inspected in three counties was 8,835, 1,632 of which were infected. Five whole counties—Polk, Forsyth, Davidson, Cabarrus, and Mecklenburg—and parts of two other counties—Rowan and McDowell—are recommended

for release from quarantine, and three others—Rutherford, Yadkin, and Cleveland—are recommended for provisional quarantine.

Ten counties in the northern part of the State and three in the southern part have been agreed upon as working ground for the next season.

Virginia.—The cooperation has been between the State board of control and its veterinarian and the county authorities on the one hand, and the Bureau force, averaging about nine inspectors and four agents, on the other. The working force of the State has been forty-one local inspectors, whose employment has ranged from two weeks to three months each. The work was confined largely to eleven counties, though some inspections were made and some educational work was done in five other counties preliminary to next season's operations. The manner of the inspection has been to make a farm-to-farm canvass of the live stock, usually with the local inspector, and, if premises were infected, to ascertain if they were quarantined, and if not, to report the fact to the local inspectors. Such places were thereafter revisited periodically to see if disinfection was being properly accomplished, and in most cases it was found that this was being done. The number of cattle inspected was 17,480, of which 5,263 were infested, many of them being reinspected one or more times.

As a direct result of the season's work in Virginia, ten counties—Franklin, Campbell, Appomattox, Buckingham, Prince Edward, Amelia, Nottoway, Powhatan, and Mathews—with an area of 4,445 square miles, are to be released from quarantine on December 1, and two other counties may be placed within the provisionally quarantined area. There are some infested herds in the ten counties referred to, but they are quarantined, and under agreement with the respective county boards of supervisors they are to remain in quarantine until released by written order of the State veterinarian approved by the chief of the Bureau of Animal Industry.

If the work outlined for next year is accomplished, as may be reasonably expected, but nine counties will remain in the quarantined area of Virginia.

SUMMARY.

In considering the work done and the results attained thus far, it should be borne in mind that the season was well advanced before the law was passed, and that, although some steps were taken in anticipation of its passage, the actual plans and organization for the work were late in formation. It should also be remembered that the amount appropriated was only intended to be used to inaugurate the work, and yet, as set forth above, employees of this Bureau have inspected 548,844 head of cattle, and have, in connection with local

authorities, so attended to their disinfection and to the supervision thereof that forty-five whole counties, and parts of thirteen other counties, with an area of almost 50,000 square miles, will probably be released from quarantine before the end of the fiscal year. This is an area larger than that of the entire State of Virginia. Plans are laid and specific work is outlined for resumption in the early spring. The State officers, cattle owners, and others affected are intensely interested; the educational work will be carried on, and there is every reason to believe that with proper funds at the disposal of the Department next season large inroads may be made into the territory now quarantined, and hundreds of thousands of cattle be given an unrestricted market, thus giving direct results to an immense number of people. This will stimulate interest in those States in which active interest is now lacking, and will doubtless result in a more general movement against the cattle tick.

If the Congress at its next session will appropriate \$250,000 for extending these operations, and will continue to sustain them adequately, and if the States interested will do their part in the way of enacting favorable laws and appropriating money to be used in this cooperative work, it is only a question of time when the southern cattle tick in this country will be a thing of the past.

DISINFECTION OF CATTLE AND PREMISES.

By H. A. MORGAN,

Director Tennessee Agricultural Experiment Station.

MR. CHAIRMAN AND GENTLEMEN: I will talk on just one phase of this question of disinfection—that associated with the knowledge of the life history of the tick.

It appears to me that we have three distinct tick areas or zones in the infected district of this country, based on temperature conditions. I believe that the crop rotation system of Tennessee will furnish an easy method of tick eradication upon absolutely natural lines. I was not familiar with the conditions existing in this northern territory until I came to Tennessee, and I had foremost in my mind those conditions which exist in Louisiana. We have a condition in Tennessee where the cattle pretty generally are free of ticks during the winter time. Now, associate that with the crop rotation system that is common in this State, and which is very similar to that in northern States. It takes in the hay crop. A farmer has a field of meadow from which he takes off a hay crop, and he can be careful to keep that field free of cattle for that season. When the winter time comes his cattle will become clean for the next spring. The same condition exists on down through Alabama, Georgia, and Mississippi, and to a limited extent in Louisiana, and in Texas. But a difference exists in

Georgia, Alabama, and Mississippi, because they have different systems of cropping. In this northern zone where we have the cattle tick off of the cattle during the winter time we have a tremendous advantage in that we do not have to disinfect the cattle. In Tennessee we have conditions that will permit easy eradication. Where we follow the rotation of the farmer, we drop into his methods. But when we get to Alabama and Georgia, where the hay crop does not exist and the pasture does not exist, the problem is a different one. Farther down, where we can look upon the tick as infesting cattle throughout the year, the problem of disinfection is an entirely different one. I believe that while the progress may be exceedingly rapid in this northern area, we are going to have more difficulty farther south. It is a question there of introducing winter crops for pasturage. What shall we do? There is no more available crop in that southern tier of infected States than oats. And I believe that the use of the oat crop in itself means tick eradication. The majority of the cattle are not under cover in winter, so we can turn them into the cornfield and the cotton field until they drop the ticks, then turn them on the oat field that will maintain them up to June. I believe that in this plan we have the line of least resistance in that territory.

Hence, to sum up, following the line of least resistance to the farmer, we have two distinct conditions—one in Tennessee, where we have no ticks on the cattle during the winter months, and another farther south.

DISCUSSION.

Doctor CARY. I have had the opportunity of traveling through Alabama for fifteen years, and have familiarized myself rather thoroughly with this rotation business. We have a problem there that is difficult, yet it is not out of reach of the practical farmer. We not only have this oat crop for winter and spring, but we have also the rye crop, sometimes the wheat crop, and sometimes the vetch crop in winter, and these afford good pasturage for spring and late winter and really bridge over that season, which is a great help to a system of rotation for the eradication of ticks.

Professor MORGAN. I am very much interested in this point. I should like to know if it is true that cattle are really freed of ticks naturally in the winter, and how far south that extends. I think that sometimes it extends to middle Alabama. Last winter was a very open winter, and ticks were on cattle up above the middle of Alabama and stayed on them all winter; but usually they are off down through middle Alabama for periods of one to two months.

Doctor DAWSON. We have ticks with us in Florida the year round. We have plenty of ticks on cattle in the winter time, but they are very much less virulent, and young animals have been brought to

Florida with comparative safety. Just about this time (December) is the time to bring animals in. Florida has done nothing at all toward tick eradication. This is the first recognition our State has taken of the tick question. I have no doubt that, when other States show what is being done, Florida will also get to work and free our cattle from the bad name which they have had. We do not have any reason to send cattle north, but after a while when the Cuban market drops out we have got to get into the raising of better cattle, and then will come up the question of eradication in Florida.

MR. KITTRELL. Mr. Chairman, I indorse what the doctor said in regard to Florida. I have demonstrated what he has stated. I shipped a carload of cattle to Tallahassee, Fla. They were grown cattle, milch cows, breeding cattle, and I shipped them in the winter; but early in the spring, even before May, they had died with "murrain," as they call it. We did not know what killed them. I received another order for a few cows and sent them, and they also died. The son of one of the farmers then came up, and I sold him sixteen calves, four or five months old, and they were shipped down in December and all lived. That does show that the ticks are less virulent in Florida during the winter than in the summer. By summer time the cattle had become somewhat immune, and that enabled them to resist the tick.

Doctor KLEIN. In regard to South Carolina, we must figure on the tick living all the year round. In applying the rotation system of pasturage to South Carolina, including the use of the cultivated field, we meet there with a difficulty that is well-nigh insurmountable, and that is that the cultivated fields of South Carolina are not fenced. You can readily see the difficulty of using the rotation system there. It will be necessary to talk to the farmers and have them put up fences in order to get rid of the tick. They regard the fence as a great inconvenience. It takes up room and reduces the area of the land that they can put under cultivation.

The CHAIRMAN. How about the timber?

Doctor KLEIN. They have not much timber. I may say that in South Carolina I have found that the most practical method of disinfecting cattle and farms is by the use of crude Beaumont oil. Begin in the fall and apply the oil; let the cattle use regular pasturage and go about as usual; but apply the oil every time the ticks appear.

The CHAIRMAN. How often?

Doctor KLEIN. The first application should be made about the 15th of September. It may have to be applied again once before Christmas, and then, perhaps, once or twice in the spring. There is one farm that I cleaned up by the use of Beaumont oil with three applications, and did not begin until the spring. There is another farm on which I did not begin until the spring and which I cleaned up

with four applications. I wish to point out another thing in regard to the use of crude Beaumont oil—it is the cheapest substance that the cattlemen can buy to disinfect cattle. The price depends entirely upon the quantity bought. If bought in barrel lots it will cost about 6 cents a gallon, or \$3 a barrel. The freight by rail from Port Arthur, Tex., amounts to about \$4 by the barrel. That makes about \$7 a barrel for this oil. That is cheaper than a man can get crude cottonseed oil, and this Beaumont oil has an advantage over all others in this, that it remains on the cattle longer; its effects are more lasting than those of any other substance that I have ever seen put upon cattle. The lasting effect will be much greater if the oil is used in the fall and spring than if it is used in the summer. In the hot weather of summer time the effect is not so lasting as in the winter.

Professor MORGAN. What effect has this treatment on the cattle of South Carolina?

Doctor KLEIN. Practically no bad effect. I have used it on cattle in South Carolina in August.

Doctor CARY. Does it increase the temperature?

Doctor KLEIN. Not perceptibly. Nearly all our pastures have a little timber, and after the oil was applied the cattle kept to the timber—hunted the shade. Only two showed any injurious effects whatever, and they merely showed a very slight irritation of the skin—nothing that lasted more than one or two days. The greatest objection that I ever heard against the oil is the odor. The negroes objected to it, probably on account of its being an odor they are not familiar with. They would not milk a cow properly after she had been treated with this oil, and I have had several cattle owners complain that it reduced the quantity of milk. But if a cow is properly milked she will show no great decrease. There may be a little decrease, but no more than would occur from putting a cow in a strange barn.

Doctor LUCKEY. I believe that the oiling of the cattle with Beaumont oil or any other kind of oil will be the principal method of getting rid of ticks. In districts farther south I think it will be found almost impossible to move cattle from pasture to pasture without their picking up infection as they travel about. But if they are oiled with any sort of oil, the ticks can not possibly get on them. I know we can get very good results by oiling cattle. Six years ago we had eight counties rather badly infested with fever ticks. In 1904 there was scarcely an animal with fever ticks. We have accomplished the result by quarantining all the cattle that were infested with ticks and requiring them to be oiled by hand. We usually used West Virginia black oil—it was not so irritating as Beaumont oil. We commenced placing infested cattle in quarantine in dry lots, where we could find the space to place them, until they were disinfected by thorough hand

dressing, which was done by pouring oil out of a bottle and hand dressing. We had 200 head disinfected in this way; and if later on they were inspected and found free, they were released, but if not free they were oiled again and placed in another pasture. We think those pastures will all be free from ticks in the spring. It was impossible to quarantine the outlying range, but we forbade the return of any disinfected cattle to the range. We depend on the use of some sort of oil. Leave cattle right on the ticky pastures and thoroughly oil them with lard or cotton-seed oil four times during the summer, and the ticks on that pasture will, in all probability, be gone by fall. Where rotation of pastures is impossible, this method is very important.

Doctor PARKER. In Texas as far north as the Red River—the extreme north of infection—I do not believe there is any season of the year that cattle on infected pastures will be free from ticks. I know in the winter time they are passed by inspectors, as they stand ordinary inspection, but this does not mean finding every tick on them. I doubt if in Hardeman County there is any time during the winter that ticks could not be found, if the pastures were pretty well infested. In fact, I have come to the conclusion that most of the ticks in northern Texas live during a large part of the winter on the cattle and not on the ground. This year we have had a very severe winter so far. On the 22d of November the temperature had gone down to about 5° above zero for four days. That is sufficient to get rid of all the large ticks on the ground, and on a pasture where the cattle had been freed of ticks by dipping, say, two or three weeks before that, there is very little probability of there being mature ticks on the ground. Only the eggs or larvæ would remain. Yet I think ticks will go through the winter unless the cattle are thoroughly dipped. The method we are pursuing there is first to free the cattle of ticks, if it is a small herd, by the application of Beaumont oil. About this time, when the wheat grows up enough to be pastured, run the cattle on that through the winter; the winter will have disposed of the infection of the cattle.

Doctor CURTICE. I am here representing the State of Virginia, in which the State veterinarian says that he would not use oil; he thinks that another way is better. The people themselves apply the oil insufficiently and indifferently and thus protract the work through one or two years. The State veterinarian does not doubt that farms may be readily cleaned by the careful use of oil. The farmers need to be taught how to take care of cows. It seems to me that the majority of southern planters do not love the cow; they do not usually have dairy cows or beef animals of the right type.

I have read somewhere—I am not speaking for the Bureau now—that experimental farms are to be started in the South; and I think

that in certain localities the Bureau could do no better than to buy wire fences, fence up inclosures, produce grass, and disinfect the cattle in that way. The fences would be much cheaper than the continual reinspection. Where the Virginia farmers hire pastures, they have applied oil with some success. Eradication will lie between the use of fences and oil.

Doctor NIGHBERT. In visiting farms infested with ticks the greatest trouble I find is to get the cattle well greased when we give instructions to grease them. In nearly every instance the owner of a cow will begin at the wrong end. He always begins his work where he sees ticks—on the hind legs and on the flanks—while he should begin at the front end. I have never seen a cow's tail greased yet; and who has not seen a number of ticks on the tail? This is a very important member of the cow's body. The ticks get on it when the cow lies on the ground. I have never seen a cow well greased when it was left to the farmer. It will be necessary for the inspector to supervise, if the disinfection is to be carried on by greasing.

Professor NEWELL. We in Louisiana are not inclined to favor the use of oil very much, or at least not as one of the principal means for eradicating ticks. Louisiana is the hotbed of the tick in the South. Those of our cattlemen who have used oils not only have injured their cattle but have failed to clear off the ticks. Not long ago I saw a bunch of cattle dipped, but all the ticks were not eradicated. If you put these cattle on pasture I do not think you can ever get rid of the ticks on the pasture. If you do, it will not be for a long period of time. In Louisiana we expect to depend on starving out the tick, ridding the cattle of ticks by rotation systems which work with mathematical certainty. When you come to grease an animal you will find that there are a great many things to consider. If it happens to be a Texas steer I know the animal will not be properly greased. There is not one animal out of fifty in Louisiana that you can grease thoroughly by any hand method. In Louisiana we have free range to contend with everywhere, and at the same time we have a much heavier tick infestation. This furnishes an incentive for a man to fence his own property, because, on account of the loss by the parasitism of the ticks, a man is perfectly willing to put up the fences when he learns that in this way he can get rid of the enemy.

Mr. MORRIS. I recommend the Oklahoma system, and when it comes to greasing, we grease the animals. We rope the steer and throw him, and grease one side, and then turn him over and grease the other. You can not grease a steer by letting him stand up or by putting him in a chute. When you throw him you can grease him well.

Professor WILLOUGHBY. How many a day can you grease that way?

Mr. MORRIS. Well, we grease a lot of them.

Doctor KEANE. A remark made by the original speaker on this subject—Professor Morgan—about working along the line of least resistance appealed to me very much. You can not eradicate ticks by any general method. I have had considerable experience in California. You have got to treat infected ranches according to the conditions which exist there. You may find a little dairy herd where the ticks can be picked off. Then you may go to a large ranch where you have a different class of cattle which should be thoroughly dipped, as this is the only way you can reach all the ticks. In California we have a great many dipping plants. In one county we have about 40. We may select a point where we have considerable infection in a district and either establish a private dipping plant or get the county to put in a dipping plant. Then we can have these infected cattle dipped all in one day. We have what we call collective dipping. We inspect these cattle right along, at intervals of about three to five weeks, and before the ticks are large enough to drop off we dip again. We aim to prevent the large females from dropping off and laying their eggs. It is only a matter of time when the ticks will be eliminated absolutely. But you have got to be there and watch the dipping and see that it is done effectively and thoroughly. If not, there is always the possibility of some of the ticks escaping, thereby setting back the work. The rotation methods and taking cattle off of infected ranges for a year is the most practical way of eradicating ticks. We have cleaned up many ranches by that method, and we have cleaned them up by dipping. We force people to do the work in California. In regard to fences, we make the owners fence up the ticky cattle, and if they break out we prosecute them; and we have made it stick in every case that we have prosecuted.

We have a quarantine law and a law for entering premises. It does not give the power to disinfect animals, but we can prohibit these cattle from being taken out. Where a man finds he can not take his cattle out of his ranch, he will do anything you ask him to do. This coming winter we are going to prohibit them from taking beef cattle out, and, unless they show a disposition to help us, we are going to prohibit the railroads from receiving the cattle for shipment.

Mr. KITTRELL. What is the extreme limit of the life of ticks without a host?

Doctor KEANE. We usually figure on keeping the seed tick off the cattle for eight months, but I have kept ticks experimentally, and I have never seen them live over three months.

I believe in keeping the cattle off an entire year. There are other points in tick work. I have in mind one large ranch, comprising some hundred thousand acres, and the infected pasture comprises about 25,000 to 30,000 acres. We removed all the cattle, intending to keep them off until this coming January or February. They will

feed on stubble, and thus we will keep the cattle off this infected pasture about eleven months. In California we also have districts where the ticks will live upon the cattle the whole year round, and other districts where they drop off.

Another thing we have been doing in California is to have practically everything arranged under an absolute quarantine. We enforce it, too, and the Government officials have been of great assistance to us in maintaining these quarantines. But the first thing to do in the eradication of ticks is to educate the people to the necessity of it, and then force them to clean up, and if you have not adequate laws you ought to get them.

Professor NEWELL. What is the average cost of dipping?

Doctor KEANE. In California we use a float dip. We use water with about an inch of oil on top, and we can dip cattle for about 4 or 5 cents a head.

Professor NEWELL. What does the oil cost for dipping?

Doctor KEANE. From 60 cents to \$1 per barrel.

Doctor CURTICE. We have found a spray pump effective in applying oil in my district—in Virginia and North Carolina.

Professor MORGAN. I believe that after we have gotten together and talked over the general situation, and have mapped out distinct areas that may be different from other areas, we ought to have tests made of these various methods in connection with the conditions to which they are applicable. In my own case, for instance, we tried dipping; we tried washing; and when we struck the Beaumont oil and found that it made the temperature of the cattle go up we quit it. It almost meant the destruction of the animal, with a temperature of 100 and such humidity as we have there. Hence, when we developed this rotation method, it naturally appealed to most of us, and I concluded that it was applicable to the entire area. Coming to Tennessee, I found a different condition, and I think we are all broad enough to adopt the method that means tick eradication for the particular area in the easiest way. And I believe we should have definite experiments carried out in particular areas, if we can have this done through the Bureau.

Professor NEWELL. I think Professor Morgan has put his finger on the vital spot. We have got to study the conditions that we have to deal with in the different States; the remedy applicable in one will not be applicable in another. The gentleman from California [Doctor Keane] mentioned that the extreme life limit of the seed tick was about three months. Mr. Dougherty has said that seed ticks live for one hundred and seventy-four days. If you include the time required for the hatching of the egg after it has been dropped by the female, I figure that you have to add about twenty-five days, making a total of two hundred days. This is a striking instance of the difference between these different places.

THE LEGAL SIDE OF THE TICK-ERADICATION PROBLEM.

By GEORGE P. McCABE, Esq.,
Solicitor, Department of Agriculture.

MR. CHAIRMAN AND GENTLEMEN: The organic act of the Bureau of Animal Industry provides that, whenever the plans and methods of the Secretary of Agriculture shall be accepted by any State or Territory in which pleuro-pneumonia or other contagious or infectious disease exists, or when such State or Territory shall have adopted plans and methods for the suppression and extirpation of such a disease, and such plans and methods shall be accepted by the Secretary of Agriculture, and whenever the governor or other properly constituted authorities signify their readiness to cooperate for the extirpation of any contagious, infectious, or communicable disease, then the Secretary of Agriculture is authorized to expend Federal appropriations in that State or Territory on investigations of the disease and on such disinfection and quarantine measures as may be necessary to prevent the spread of the disease from one State or Territory into another.

When the Department determined to take up the problem of tick eradication it was confronted with several vital legal and administrative questions. Under our form of government the eradication and control of diseases of live stock within a State are entirely within the police power of the State and are not subject to regulation by the Federal Government, except as may be necessary and incidental to the regulation of interstate commerce. It seemed that if the Department desired to expend a Federal appropriation on the work, and to use the organization of the Bureau of Animal Industry to help the States, it would be necessary that the inspectors and employees of the Bureau of Animal Industry should have legal authority to enforce such needful quarantine and disinfection regulations as might be agreed upon by the Department and the State. Moral suasion will sometimes accomplish wonders. For the general welfare of the community self-sacrificing citizens will often voluntarily subject themselves to loss and damage, but, as a general proposition, when it is desired to restrict citizens in the disposition and use of their property, a warrant for such action must be found on the statute books. Otherwise some obstreperous individual will kick over the traces and undo all the good that has been accomplished by the forbearance of his neighbors. Therefore, an examination was made of the statutes of the several States to ascertain the following points:

1. Are local officers authorized and empowered to enter premises to inspect live stock, to enforce the quarantine of counties, districts, farms, and ranches, and to control the movement of live stock therefrom?

2. Are local officers empowered to enforce such disinfection of animals and premises as may be necessary?

3. Are State officers authorized to issue rules and regulations establishing and maintaining quarantine lines?

4. May States confer authority upon Federal employees to act as officers of the State, to enter premises to inspect live stock, to enforce quarantine of counties, districts, farms, and ranches, and to control the movement of live stock therefrom, and to enforce such disinfection of animals and premises as may be agreed upon as necessary by the State authorities and the Department?

The search of the statutes disclosed several interesting facts. Four important southern States and one Territory had no statutes to cover these matters. Several others were prevented by the terms of the constitution from allowing any Federal employee to act in any capacity as an employee of the State. Other States were provided with adequate laws but no effective organization, while a few States had good laws and good administrative organizations.

I will not take up the time of this meeting by giving in detail the laws of the various States upon which the conclusions of the Department were based. In each case the conclusions were submitted to the Attorney-General of the State, and replies were received from a majority of those officials. I have the references to these laws and will be glad to discuss the matter individually with any of you. It may not be amiss, however, to state the general results of the examination.

At the time the examination was made, so far as could be learned, Alabama, Florida, Indian Territory, Mississippi, and South Carolina had no laws covering the subject.

In Arkansas the peace officers can enforce only such quarantine lines as are fixed by the State law or by the United States, and State officers can not issue rules and regulations establishing and maintaining quarantine lines, nor can they enforce the necessary disinfection of animals and premises.

In California local officers are authorized and empowered to enter premises, to inspect live stock, and to enforce quarantine, and are impliedly authorized to enforce disinfection of animals and premises. They are also authorized to issue rules and regulations establishing and maintaining quarantine lines; but the State can not confer authority upon Federal representatives to act as officials of the State.

In Georgia, Kentucky, Oklahoma, Tennessee, and Virginia the local officers possess all the authority necessary, and the State can confer necessary authority upon Government inspectors.

The law of North Carolina seems to be sufficient, with the exception that local officers are not empowered to enforce such disinfection of animals and premises as may be necessary.

While Missouri has laws on the subject, it is probable that local officers do not possess, in any particular, the necessary authority to carry on effective tick-eradication work. Missouri may not confer authority upon Federal representatives to act as officials of the State in such matters.

In Texas the local authorities possess sufficient power, but by constitutional amendment it is forbidden to confer authority upon Federal representatives to act as officials of the State in such matters.

Passing now from the examination of the statutes already in force to the consideration of an ideal statute for the work, not only of tick eradication, but for the control of all contagious and infectious diseases of live stock, the Department has, in response to requests from the officials of various States, indicated the essential provisions which, in the opinion of the Department, should be included in a contagious and infectious disease law. Briefly summarized, these provisions may be stated as follows:

1. The governor or other responsible State official should be authorized and directed, on the recommendation of a State board hereinafter provided for, to quarantine any portion of the State, no matter how large or how small, when he shall determine the fact that cattle or other live stock in such part of the State are infected with any contagious, infectious, or communicable disease, and to raise this quarantine at any time on the recommendation of the board. He should be directed to give proper notice of the establishment of quarantine to the officers of railroad, steamboat, or other transportation companies doing business in or through any quarantined part of the State, and to publish in such newspapers as he may deem necessary notice of the establishment of quarantine.

2. It should be provided that no railroad company, or the owner or master of any steam or sailing or other vessel or boat, should receive for transportation, or transport from the quarantined part of the State to a nonquarantined part of the State, any cattle or other live stock, except as will be hereafter indicated. All persons, companies, or corporations should be forbidden to deliver for such transportation to any railroad company, or to the master or owner of any boat or vessel, any cattle or other live stock, except as will be hereafter indicated; and all persons, companies, or corporations should be forbidden to drive on foot, or to cause to be driven on foot, or to transport in private conveyance, or to cause to be transported in private conveyance, from a quarantined part of the State to a nonquarantined part of the State, any cattle or other live stock, except as will be hereafter indicated.

3. Provision should be made for a State board to control the matter of quarantine, and this State board should be authorized and directed, when the public safety will permit, to make and promulgate

rules and regulations which will permit and govern the inspection, disinfection, certification, treatment, handling, and method and manner of delivery and shipment of cattle or other live stock from the quarantined part of the State to the nonquarantined part of the State; to enforce disinfection of premises and live stock, and also the purchase and destruction of dangerously infected live stock, and buildings liable to transmit infection. The board should be required to give notice of such rules and regulations in the manner provided for notice of the establishment of quarantine by the governor.

4. It should be provided that cattle or other live stock may be moved from a quarantined part of the State to a nonquarantined part of the State under and in compliance with the rules and regulations of the State board hereinbefore provided for, and it should be made unlawful to move, or to allow to be moved, any cattle or other live stock from the quarantined part of the State to the nonquarantined part of the State in manner or method or under conditions other than those prescribed by the published regulations of the State board.

5. Provision should be made for the appointment of inspectors to perform their work under the control and regulations of the State board. These inspectors should have the right to enter premises to inspect live stock, and to perform all the functions demanded by the law and the regulations of the State board made thereunder. These inspectors should perform their duties under the supervision of a competent State veterinarian.

6. Provision should be made for the payment of the cost of inspection, disinfection, quarantine, etc., preferably by a State appropriation, but if this be impracticable, then by fees to be determined and fixed by the State board and collected by that board. From this fund the salaries and expenses of the inspectors should be paid. The Department considers it bad administration to allow the direct collection of fees by inspectors as compensation for their services.

7. Provision should be made for the appraisal, condemnation, and remuneration to the owner for a part or the whole valuation of any premises or animals necessarily destroyed in controlling contagious or infectious diseases within the State.

8. The governor of the State should be authorized to cooperate with the Secretary of Agriculture in the prevention and eradication of contagious and infectious diseases of live stock, and, when the constitution of the State will permit, he should be authorized to appoint employees of the Department of Agriculture to act as State officers in contagious and infectious disease work. These employees of the Department of Agriculture should serve without compensation from the State, and when so appointed they should have all the power exercised by State inspectors. When the constitution of the State

will not permit such authority to be conferred upon employees of the Department, the work can be carried on by having a Department employee perform his work in company with a State inspector. However, this plan, in many cases, makes it burdensome upon the State, because it requires the employment of more State inspectors than would otherwise be necessary.

9. A suitable penalty should be provided for violation of the law or of the rules and regulations made thereunder.

If objection be made to the above provisions on the ground that thereby arbitrary absolute power is vested in the governor and State board, the answer is that, in the opinion of the Department, to secure effective control, prevent dissemination, and make possible the eradication of contagious and infectious diseases of live stock, it is necessary for this absolute and arbitrary power to be lodged in responsible public officers. The essential parts of the above provisions are, applied to State conditions, substantially those of the act of Congress of March 3, 1905, entitled "An act to enable the Secretary of Agriculture to establish and maintain quarantine districts," etc. To my personal knowledge there were no more enthusiastic advocates of the passage of the act of March 3, 1905, than the Senators and Representatives from the States you represent, and if the people of these Southern States are willing that this arbitrary and absolute power in regard to interstate commerce should be vested in the Secretary of Agriculture, as it is vested to-day, then no objection should be raised to the lodgment of the same power, so far as the State is concerned, in your own elective officers.

It is of course to be remembered that the above provisions may be entirely unsuited to certain local conditions, and the Department stands ready, upon the invitation of the proper officers of any State, to consider local conditions and to advise in a friendly way regarding the desirable provisions of a live-stock law for that State.

DISCUSSION.

Doctor LUCKEY. Did I understand you to say that the State of Missouri has not power to confer authority on the Federal inspectors?

Mr. McCABE. Missouri may not confer authority under existing law. There is no affirmative constitutional provision authorizing it to be done. The State authorities are not expressly authorized to confer authority upon the Federal officers.

Doctor CARY. I would like to ask a question in regard to the courts sustaining the actions of the board under the rules and regulations of the different States: Would the courts probably sustain the action of the sanitary boards in enforcing the rules and regulations?

Mr. McCABE. Under the constitution of a State, may a legislature fix a penalty for the violation of the rules and regulations of a sanitary board? Is that the question? So far as I have looked into it—I have not examined the constitutions of all the States on that point—the rule seems to be generally as in the Constitution of the United States. It is a constitutional axiom that the legislature can not delegate legislative power to any board. The legislature must do the lawmaking, but the legislature may provide that the board can exercise administrative discretion. The act of Congress of March 3, 1905, was drawn to meet that very objection. We have not found anyone who is willing to attack the constitutionality of that law. For instance, in Tennessee the State board will have the right to recommend that four counties be quarantined. Then as the law would stand it should be unlawful to move any cattle from those four counties in any way. But the State board of control may issue rules and regulations which shall govern the movement of cattle from those four counties, and any movement from those four counties differing from the manner prescribed by the State board would be unlawful. That makes it a violation to move the cattle except in accordance with those rules.

Doctor PARKER. Is presence of the tick, *Boophilus annulatus*, special evidence of a communicable disease?

The CHAIRMAN. Doctor Melvin, can not you answer that question?

Doctor MELVIN. If such a question should arise in court I think it would be the duty of the court to establish by expert opinion whether this tick was the disseminator of the disease, and I do not think there would be any trouble in convincing the court that this tick is the disseminator of the disease, just as infected clothing might be the disseminator of smallpox, or any other similar disease. Of course it would lie wholly with the court to construe it and to rule according to the expert testimony submitted.

Doctor CURTICE. In North Carolina the *Boophilus annulatus* is mentioned in the quarantine law. That would be sufficient.

Doctor MELVIN. I do not think it would be necessary to demonstrate to the court that any particular ticks were infectious ticks. The mere fact of this species being the conveyor of the disease, no other tick being the conveyor, would be sufficient evidence to justify quarantine.

The CHAIRMAN. It would be just like expert testimony in any other case. Would that apply to ticks on horses?

Doctor MELVIN. Yes, sir.

Mr. McCABE. Under our Federal law, in case of a question as to whether or not an animal is infected, the burden of proof is always on the party who seeks to prove that it is not infected. That applies to healthy cattle as well as to diseased cattle.

Doctor PARKER. The Texas live-stock sanitary commission has taken the position that it can not secure the control of ticky horses, which, of course, simply embarrasses our work.

Doctor CURTICE. One point that comes up in the administration of the law is this: The laws are published in a book which is sent to the lawyers. The rules and regulations of the board of cattle control are published, but sometimes they are not sent to the lawyers; and the question comes up, What is proper publication? If they are sent to the lawyers only, the cattlemen do not get them. They may be sent to some cattlemen and not to others. Finally, they are changed from time to time, and those changes do not get into the hands of all concerned; thus the man that violates may not have an opportunity to get the law if the rules and regulations are part of the law; and it becomes very important to know by what method the States, and we ourselves, should inform the people of what the law is. It seems to me we should take more care in posting notices at the court-houses, and in posting weatherproof, untearable notices along the line.

The CHAIRMAN. We do that in Georgia.

Doctor CURTICE. Every time a change is made. These points we will have to consider, and they become more and more important as the lines moves in, because of the danger of the disinfected region becoming again infected.

Mr. BROWN. There is one point regarding our law in Virginia—and I did not observe that Mr. McCabe's paper covered it—and that is as to the power of the State board to authorize the board of supervisors of a county to quarantine against counties also in the quarantine district.

Mr. McCABE. That was covered by the provision for the State board of control.

Doctor KLEIN. It has been my observation that considerable inconvenience is sometimes caused by quarantine regulations being put into force immediately—that is, they are not issued to take effect on and after a certain date, say thirty days after issuance; most of them become effective immediately. Changes are made in the quarantine regulations that cause great inconvenience and sometimes breed contention that would not exist if it were not for that fact. Of course I understand that it is not always possible to give notice; there may be cases where it is impossible to give notice; the situation may demand immediate quarantine. But I think there are many occasions where regulations are issued to cover a coming year, and we have learned by our experience of this year that certain departures from the present regulations would be required. In such cases, if notice of thirty or sixty days or three months were given of the new regulations, it would help matters considerably.

Mr. KITTRELL. I think one trouble in this State, and I presume in others, is that this law is not charged to the grand juries by the judge.

There are comparatively few people in the State who know there is a law on this subject, and it is not taken into cognizance by the juries.

The CHAIRMAN. Did you ask the judges to give it in charge?

Mr. KITTRELL. No, sir; but I believe it ought to be charged, and the grand jury ought to have power; and I think if that were done the law could be made very helpful and very effective.

Mr. MORRIS. I think these regulations are made to meet emergencies. When we find a county infected, it would be poor policy to give thirty days' notice. A man could take advantage of the opportunity to move his cattle. After the board has determined on rules and regulations the governor issues a proclamation that such and such shall be sufficient notice.

COOPERATION BETWEEN THE STATES AND THE FEDERAL GOVERNMENT.

By D. F. LUCKEY,

State Veterinarian of Missouri.

Mr. CHAIRMAN AND GENTLEMEN: No one doubts that in the work of the control of contagious diseases of all kinds, particularly in the work of controlling the spread of fever ticks, there ought to be the heartiest cooperation between the officers of the various States and of the Federal Government. We have come here to meet the officers of the Department of Agriculture, and I think this manifestation is a better proof of the spirit of cooperation which exists between the States and the Department than anything I could say.

After the enactment of suitable laws in the various States, then comes the execution of these laws. Each State and the Bureau should appoint competent, efficient, and industrious men and instruct them to work together. The line of cooperation that works in one State will sometimes not work in another. In the State of Missouri in the past we have failed to get results in some cases on account of the lack of cooperation and proper understanding between the officials of our State and those of the Department of Agriculture. A spirit of antagonism should not exist in any State, and I have done everything I possibly could to eradicate that before beginning the eradication of ticks.

A few years ago the regulations of the Federal Department and those of the State of Missouri regarding the handling of southern cattle were entirely at variance. The period of inspection was different, and the State regulations did not recognize a permit issued by a Federal inspector, neither did the Federal regulations recognize a permit issued by a State inspector. I have advocated that we work together closely, understand each other, talk candidly over things in which we differ, and have no misunderstanding; and I have advised the board of agriculture to make quarantine regulations, when they

were necessary, to comply exactly with the quarantine regulations of the Bureau of Animal Industry. I am prepared to go still further, and, on the theory that the fewer quarantine regulations we have the better, I would recommend that our State withdraw her quarantine regulations altogether, as far as southern cattle fever is concerned.

I believe the protective line work should be wholly north of the quarantine line and should be left entirely with the Department of Agriculture, and that the cooperative enforcement of the line should be carried on where the line crosses a State. Such is not the case with the State of Missouri, and I do not believe there is a reason for the continuance of the quarantine regulations of the State. I believe we ought to have definite plans and that the plans and the work of the State officials and of the Federal Government should be in harmony. I also believe that whenever it is possible for those in the State to speak a good word for the work of the Department they should do so. I believe the officers of every State should do that.

DISCUSSION.

Doctor KEANE. A very important matter—the matter of a general live stock law—was brought up this morning by Mr. McCabe. I believe every State that is interested in this line of work should adopt a new live-stock law of the character indicated by Mr. McCabe. It will greatly facilitate this work, and I would like to hear a little discussion on that matter.

The CHAIRMAN. I would be very glad to request Mr. McCabe, with the approval of Doctor Melvin and Doctor Steddom, to prepare a general law, and I will guarantee, so far as Georgia is concerned, that we will amend our laws wherever it is necessary to conform to that general law.

Eight years ago we formed an association of the commissioners of agriculture of the Southern States. We found the fertilizer laws conflicting. Alabama had one law, Georgia another, and Tennessee still another, and they all conflicted as to the registration of the brands of fertilizers, the per cent of phosphoric acid, ammonia, and potash required, and the manner in which these goods should be branded; so that in Texas they had to have one brand on the sack, and in Georgia another. This was the condition we met in the different States, but after we had gotten together we undertook to have a general law passed by all the States in which fertilizers were used requiring that the guaranteed analysis, the manner of branding, and the way of registration should be about the same.

I think that same idea should get hold of us in tick-eradication work. We can not proceed on the best and most progressive lines unless we agree as to some plan like that mapped out this morning. I think Doctor Steddom and Doctor Melvin will bear me out in saying

that we have a very good law for tick-eradication work in the State of Georgia. The whole business is left to the State department of agriculture and not to the governor. It is made the duty of the commissioner of agriculture to aid and cooperate in this work, and I think we have all the law that is found necessary. I have had the State attorney-general construe that law, and I asked him if amendments were needed. He said that the law was just as broad as was necessary. I talked to Doctor Payne about it and he said it was a good law. Doctor Klein thinks it is a good law. We formulated rules and regulations under that law. I hope some definite plan will be adopted by which we can all go home and go before the next legislature with a uniform law, and thus get together in this work.

THE ENFORCEMENT OF QUARANTINE REGULATIONS.

By THOMAS MORRIS,

Secretary Oklahoma Live-Stock Sanitary Commission.

MR. CHAIRMAN AND GENTLEMEN: I suppose this subject means the enforcement by States. Oklahoma being a Territory and young, was fortunate enough to have an excellent quarantine law passed in 1897; but our resources being limited we were never allowed enough money to enforce it as it should be enforced. However, the legislature two years ago made provision for the appointment of seven inspectors, appropriating \$10,000 for their pay, which, by the way, was not enough by \$2,000 to employ them regularly. Since that time we have undertaken to give a more thorough enforcement of the Territorial laws. We made our rules and regulations, a proclamation was issued by the governor, and we began enforcing the law as best we could. Last year we began to make a range canvass in two counties. This year the work has been carried on by the Federal employees, and our own forces have all been engaged in it.

In enforcing these laws Oklahoma is peculiarly situated. Mr. Morgan speaks about disinfecting pastures by taking cattle off. Oklahoma being a new country, we find that will not do. A man breaks out a part of his land and leaves 40 to 80 acres for a permanent pasture. It may be all the land he has on his place that has a fence around it. That does not give him a chance to shift his cattle. When we find infection we quarantine it. We compel people to clean their cattle. Our law provides that an inspector may call to his aid the sheriff of any county to assist, but it is the policy of the board to give those people a chance. We instruct them the best we can, and if they will follow instructions they can clean their cattle without any expense to themselves; but if they do not believe in the tick theory we simply place those cattle in the hands of the sheriff and they are disinfected at the owner's expense. Our mode of disinfection is by

greasing with crude oil. We do not bother with anything else. A great many dipping vats are being established over the Territory, and we encourage the establishment of them.

Our law provides that the Territorial board shall cooperate with the Federal authorities, and our rules and regulations must comply with their rules and regulations. That I think is a very good thing in any State law. Our board this year passed resolutions giving all Federal inspectors working in the Territory authority to enforce quarantine measures. The main thing in enforcing quarantine regulations in any State is to educate the people, to get them interested, to make them understand the importance and value of the work, to show them the depreciation of their cattle when they are below the quarantine line, and the advantages of an open market. Of course, we find a few people who will not listen to reason. Those people we simply show.

DISCUSSION.

Doctor KEANE. I consider maintaining the quarantine a very important feature in this work. We sometimes overlook the fact that we ought to place individual quarantines in the quarantined areas; that is, a range should be kept in quarantine. The only way to do this is by proper live-stock laws and proper enforcement.

Mr. MORRIS. That has been our work in Oklahoma during the last two years. We make a regular inspection. We inspect all the pastures about this time of year, and if there is no infection we release the pasture until next April, holding it in quarantine for later inspection. Since the tick-eradication work has been begun and we have the help of Federal inspectors, we do not need to do that. If a man applies to us to move cattle and if they are inspected and found clean we allow him to move them. He can move no other cattle. We hope for great results, and there is every indication of our hopes being realized; but the individual quarantine is the main feature in ridding the country of ticks. When quarantine is placed there is a notice, and the man is instructed by our inspector. The cattle must be thoroughly greased every thirty days, and we generally give a lesson in greasing. As I said this morning, our men are all cowboys and can rope a steer. Their plan is simply to throw a rope over his horns and heels so they can throw him down and grease him all over. I think that the dipping vat is the proper way, but it is expensive, and the farmers can not all establish vats; but they are establishing them in neighborhoods, and we have adopted the dipping plan wherever they have a dipping vat in the neighborhood. We allow all cattle in the neighborhood to go to that vat, but the work must be under supervision. The cattle must be under supervision before leaving the pasture, to prevent infesting the public highways. We have an inspector present at the dipping. The people have peculiar ideas.

Men in the eradication work have quarantined pastures, and probably afterwards received a letter from the owner stating that his cattle are clean and asking that they be released. The idea has been for the inspector to follow up this work twenty days after the first inspection. We have not been able to do that in all cases, but we are doing it now. We have a force in hand so that, whenever a man applies for inspection, we can furnish a man to visit his pasture, and if his cattle are free they are let out.

MR. KITTRELL. Does your law compel a man to clear his own place from ticks? I know you can quarantine them.

MR. MORRIS. The law says we can enforce such local measures as are necessary to get clear of the infection, and I believe we have the power to make them do it. If a man will not, we put the cattle in the hands of the sheriff. When we quarantine cattle, we take them out of the owner's hands and turn them over to the sheriff, the same as if levied on, because he can levy and sell at the owner's expense if he does not pay.

PROFESSOR NEWELL. How do they enforce the regulation?

MR. MORRIS. By the penalty attached to our law, the lowest fine being \$100.

PROFESSOR NEWELL. Well, you must get the evidence to convict them. A man may move his cattle away overnight.

MR. MORRIS. Some of our judges have not given us a fair show. We did get a decision in the district court of Noble County. The man's farm is quarantined; the line is around his farm. The judge held that, where it could be proved that cattle were on one side of the line one day and on the other side of the line at another period, that constituted a violation of the quarantine law.

PROFESSOR NEWELL. But you can not prove the identity of the cattle except by branding.

MR. MORRIS. We do not find any difficulty in that case. In our county the people who haven't got the ticks are very particular about reporting violations.

PROFESSOR NEWELL. Have you ever worked in a locality where a man will protect his neighbor?

MR. MORRIS. About one out of ten is antagonistic in our locality.

PROFESSOR NEWELL. I don't think men would obey a law providing for individual quarantine in Louisiana. We can not depend on compliance with such a law, because it would be considered absurd.

MR. MORRIS. I have so far had only about three reports of persons who have moved their cattle from quarantined pastures before we released them; I have inspectors working on the evidence, and those men will be prosecuted. We never fail to stick a man for his \$100 fine.

EDUCATION AND PUBLICITY AS AN AID TO TICK ERADICATION.

By C. A. CARY,

Professor of Veterinary Science, Alabama Agricultural and Mechanical College.

MR. CHAIRMAN AND GENTLEMEN: I do not represent one of the leading States in this work, but I do represent a State that is pretty well infested by ticks. Doctor Steddom reported that a majority of the farms inspected are infested. My plan of work has been to use the farmers' institutes to educate the farmer. Out of 85 sessions last year—from the 1st of July, 1905, to the 1st of July, 1906—I do not think we had a session at which the tick question was not discussed thoroughly, if not by myself, by Professor Morgan or someone else thoroughly conversant with the subject. When we commenced the work this fall in the two counties bordering on Tennessee we began to write on the subject. We kept the county papers more or less full of the tick question for several weeks. This year men went up along the line between Tennessee and Alabama and had township meetings of all the farmers we could get out in those townships. In addition, we thoroughly discussed the question with individual farmers. I said to the inspectors: "When you get to a man's farm tell him all you can, and look over his farm and see if there is any particular advantage in using this or that method, and discuss it thoroughly with him." I do not think we should take just one method and go out and harp on that method and nothing else, but if we see that one man can readily starve out the ticks, give him that method. If he has but a few cattle—as some of the negroes have—he can clean them by hand. We advise them to grease the animals, and we keep them at it. Then I hold out to them that if they do their part by a certain time we will try to get them out of quarantine. Of course we do not promise to get them out. In this work we have had no law at all—not one word of a law. Once in a while we run across a man who is opposed to our work, and we say, "How many cattle have you?" "That is none of your business." We go on by and find out from his neighbors something about him. We are going to get a law this winter.

Now, I want to say a few words to the inspectors, without meaning any offense whatever. Inspectors sometimes do not know some things they ought to know. They ought to know more about the cattle-farming conditions in the communities in which they are inspecting. They know many things about the life history of the tick and about veterinary science; but if the farmer should ask some simple practical question and the inspector answers "I don't know," what does the farmer say? He says, "That fellow is not up to his business." I know this from experience. I find that the inspectors coming into Alabama ought to have a course in Alabama agriculture along the lines of rotation and diversification of crops.

You can not make a general rule. You must say "Have this crop here and that pasture there." When the inspector comes up against a farmer, he should have a practical answer right on the end of his tongue.

Let me tell you now where some of you are going to run up against a difficulty next spring. You have told the old farmer that if he will grease his cattle he will be rid of the ticks. Along next spring the ticks' eggs will hatch out, and his cattle will be reinfested. Then he will say "You lied to me then, and I don't believe you." We may just as well face this thing. Be careful about what you promise these old farmers, and when you promise to do a certain thing do it in such a way that it will bring success.

I wish every inspector that goes into the South, especially from the North, could go to some of these short-course agricultural schools and learn the agricultural conditions of the South, so that he will know what to do. You ought to learn the main principles in a very short time if you go to one of these places where you will be properly instructed. We have a ten-day course in which we have addresses by the superintendents from different States. We have from 500 to 600 farmers in attendance, and we give them instruction. If the inspectors could have the benefits of such a course, they would be better prepared to tell the farmers what to do, and their advice would not be too general. The farmer wants you to say just what to do, and he wants to realize that you know what you are talking about. Then he will believe you and follow your advice, and will do a great deal more than if he thinks you are telling him something that is not true.

If you go into a township and tell all you know about the ticks, you may have to repeat and repeat in order to get it into the men's minds. But you should recollect that the more you get it into one man's mind the more he will spread it among the others. In Alabama I am often asked to make a "tick talk." They laugh when I get up, and say, "There comes the tick man again." Let them laugh. I never let an occasion go by without having the tick question discussed.

DISCUSSION.

Mr. BROWN. I have in Virginia been a member of the board of control since the matter was turned over to the State, or rather since the line was run through the State. This question of bringing the matter home to the people is the most important thing in the work of tick eradication. You must bring it home to the people who own the cattle. In the last few years we have been trying to get the counties along the quarantine line to take enough interest in the matter to appoint local inspectors and support them. Our State supports the quarantine work and pays all the expenses of such officers as

we send into the field; but under our constitution no money can be paid out of the treasury except in pursuance of appropriations, and the work has grown faster than the appropriations. We have now at work in Virginia over fifty local inspectors who are acquainted with the farming conditions in these counties. It has been our good fortune to have the cooperation of the United States authorities. I believe Doctor Curtice will bear me out in stating that the work of the local men has been good, so much so that Doctor Curtice and our State inspector reported this fall to our board that ten counties had been freed from the cattle tick, and recommended that we release those counties from quarantine and leave in quarantine only such farms as were affected. That recommendation was approved by the Secretary of Agriculture on December 1, and ten counties in Virginia were released from quarantine.

When you can get the people interested you have a decided advantage in the educational work. Of course the local workers are not college graduates, and possibly they are not as highly instructed in the life history of the tick as they should be, but when their work is coupled with that of the Bureau inspectors we have an ideal working force. With the United States Government and the State government cooperating in the work, the State and the counties furnishing local men who are there all the time, it strikes me that very decided results can be accomplished.

We have simply used the starving-out process in Virginia. We have recommended to the people of the counties the "no-fence" law, under which each man fences in his own cattle. The fence law in Virginia is left in the hands of the local authorities. Any county can adopt a "no-fence" law for that county.

I do not believe in going too fast, but I hope the work done this fall in Virginia by the Federal inspectors will bear good fruit, and I believe that is the true line of publicity.

Professor WILLOUGHBY. The educational side of tick eradication is very important. In fact, it is generally recognized as the first thing that must be done in our work, and upon the method of this first work depends the success of the work that is to follow. This work should be done carefully, and it should be done as enthusiastically as possible; yet we should not present before any audience the idea that tick eradication will be easy, because they will find out later that it is not so. Still I believe we should present these matters in as favorable a light as possible.

I hope that the future appropriations given to the Bureau will make it possible for more inspectors to be sent to the farmers' conventions, to the meetings of the live-stock associations and agricultural societies, and even to the regular farmers' institute meetings, as they may be held in the different States. While most of these

inspectors are quite busy superintending the details of their work, it occurs to me that perhaps other men who are gifted with the power of oratory might be detailed from the Bureau to go into different States at different times of the year and present the question of tick eradication. Another good plan would be for all inspectors engaged in this educational work to use the local newspapers more than has been done in the past. Of course the agricultural papers should be used to the fullest extent. In other words, keep the work constantly before the people until their minds become so imbued with it that they realize it is a good work and will constantly support it.

I also hope that at another meeting, such as this, we may be able to have more of the local inspectors present. It would be a great source of enthusiasm and inspiration to the men who are out on the firing line.

MR. A. H. PETTIBONE. We have in Tennessee a most admirable law, but it lacks just this—it is printed in the acts of the legislature and a few copies are sent to the county clerks, and there it stops. The lawyers and the people know very little about it. The law ought to contain some provision making it the duty of all the judges in the State to give that law in charge to the grand juries. I found in my investigations over the State of Tennessee that the law is not known to one citizen in five. I want to get the law to the people. You can not enforce such a law unless you have cooperation between the Bureau of Animal Industry and the various authorities of the States. There should be the most cordial cooperation, and I am thankful there is in Tennessee.

I have published in forty-seven different newspapers in the counties that I have visited a two-column letter, and I have not yet found an editor who was not willing to publish my letter. These letters have gone right into the farmers' hands. Thirty-seven of the State papers have published my letter on the cause and the cure of the Texas cattle fever, urging always the cooperation of the people with the authorities in the enforcement of the quarantine. I have gone to the county boards, to the lawyers, to the editors, and in that way endeavored to get the cooperation of the people; and I find the people are perfectly willing, but they are uninstructed; they do not know the law. Who will go to the county court clerk and get a copy of the State statutes, hunt up chapter 156, and read it for his information or his direction?

In a recent trial in the county of Carroll a man whom we had to prosecute was defended by a young lawyer who did not know of the existence of this act of 1901. Here was a lawyer of high intelligence, a man elected to the next legislature, who absolutely did not know of the existence of the law. What, then, can you expect of the common people?

The CHAIRMAN. In Georgia we have our laws and rules and regulations relating to this matter published, and we send out ten or fifteen thousand copies.

Mr. PETTIBONE. That ought to be done in Tennessee. I think a compilation of that kind ought to be made right away. The best document that I have yet seen on the subject is Circular 97 of the Bureau of Animal Industry, "How to Get Rid of Cattle Ticks." In my work I have distributed many copies of this circular by mail and otherwise.

Doctor PARKER. I wish to be recognized by the chair this time as representing the live-stock commission of Texas. Texas has had troubles different from most of the other States represented here. Cattle in most of the States are a kind of "side line" of agriculture. Over a large part of Texas and parts of California we have ranches where they raise nothing but cattle, and the profits of the business depend on the ability of the people to move their cattle to market. One of the greatest educational methods we have had there is old Mother Nature. The losses from splenetic fever are a powerful educator. A good many of the ranchers have been unable to move their cattle when they wanted to without violation of the law; they have been hampered. This, also, has educated them. With the proposed strict enforcement against the movement of ticky cattle above the quarantine line, which we are beginning in Texas in all localities, there will be some more education.

Most of our inspectors in Texas are trained in tick work and understand the disease; they also understand ranch work, and can talk intelligently to the ranchman about the best management for his own ranch. A majority of the men at work both for the Bureau and for the State of Texas can go to a ranch and in a short while understand the conditions, and can tell the ranchman what he must do. The inspectors are posted on rotation of crops. There was a ranch of more than 150,000 acres, more or less ticky, above the quarantine line. The owner had read the papers and knew the law on ticky cattle. He also knew more or less of the dangers of splenetic fever; but, with all his knowledge and experience, he was not up to the point of action on the eradication of ticks. It was only when one of our inspectors had a personal talk with him and explained things to him that he became convinced that it was money to him to eradicate ticks, and he said to his ranch foreman: "Put in as many dipping vats as are necessary, improve the fences, and eradicate the ticks next year. My land is worth \$3 more an acre free of ticks than it is when ticky." That kind of education pays.

I believe in the use of newspapers. So far I have made only one talk on this subject, and that was out in a cattle country. We were there handling the open-range proposition—extermination of

the ticks on the open range. That is a hard problem—five or six hundred square miles with not a fence. I gave them an opportunity to ask questions, and after the meeting closed they still kept on asking questions. I have a pocket full of letters saying this man and that man is interested in this work and has pledged himself that he will dip his cattle; that he will follow the plan we outline. That is good educational work, but it will take time to secure results in that kind of locality.

Doctor MELVIN. With reference to this farm-management problem, I should like to ask Doctor Cary whether it would not be feasible to have special meetings for inspectors. Of course they should not all be held in one place. They would have to be held at several points. Would it not be feasible to have those who are versed in farm management give instruction to our inspectors? What is the length of time such a course would consume?

Doctor CARY. If the inspectors in one or two States could be gotten together for two or three days, and could have a course along the line of rotation of crops, it could be done very cheaply. Most of the lecturers could be gotten there for their expenses. I think it would be a very wise thing to have such a meeting once a year. I believe Georgia and Alabama could be combined. It would occupy two or three days, provided the men have already had some drill along these lines. I hope Doctor Melvin can see his way clear to holding some such meetings. I believe the average man could get a good outline in three days, with three lectures in the morning, three in the afternoon, and one at night. It might even be done in less time.

My experience has taught me the great value of personal contact and instruction. We have some 15,000 names on our experiment station list, and every time a bulletin is issued we mail a copy to each address; but when I go around over the State with the station superintendent to lecture on the same subjects I find that about nine out of ten of these men have shoved these bulletins into pigeonholes, and that is the end of them—they do not read them. The same is true of this work. But when we get out and talk and let them ask questions we can convince them as we can in no other way. This way of educating these men beats all the writing in newspapers or sending out bulletins.

Doctor LINCOLN. In Tennessee we do not have any trouble in getting in line the farmer who has a number of cattle. Here 25 cattle are considered quite a bunch. That owner is easily reached by talking the financial considerations to him. But we do have trouble with those who own only 1 or 2 milch cows. If there were some way of handling that class of farmers the proposition would be much easier.

The CHAIRMAN. It is the same way in Georgia.

Doctor LINCOLN. I would like to know how to handle that class of men. They have nothing to sell, and do not expect to have.

Doctor CARY. When I find a man like that I quarantine his cattle. I think we need laws in the different States by which we can compel men to clean up their farms.

Doctor CURTICE. The greatest educational force has been the restraint of the cattle trade. First men learned that they did not want cattle coming from a certain direction to pass through their neighborhood, because it caused their own cattle to die. So they kept the cattle back, ticks and all, and that was education. Following upon that a quarantine line was established from Virginia to California, and the quarantine has increased in severity from the time it was first established until now; but even yet it does not seem to be thoroughly effective. There are ways and ways of marketing cattle, and a man who has quarantined cattle thinks that it does not matter to him whether his cattle are ticky or not. I think, of course, being an inspector, that we should use the strong arm of the law as the main factor; I believe we should ever look to increasing the severity of quarantine against the infected animal. The placing of quarantine upon areas instead of counties has been a move in that direction. This educates two classes of men—those who own the cattle, and their neighbors. You are told many times that “it does not matter to me,” but the man who says that forgets. Next day he is running to you—“I would like to take that cow over to my neighbor’s.” If we have good quarantine service it is then that we get in our work. We will have the single-cow man working better than the man with a dozen cows, who intends to market them November 1, because he can get the ticks off by that time. He has been driving his ticky cattle off after November 1 or December 15, as the law may read. If the States will support us there is going to be no driving of the ticky cattle, unless the owner has done something for them. We have tried to bring that matter before the people of Virginia, North Carolina, and Alabama. I believe even now that the people are waking up to the idea that their cattle may be in quarantine next year.

I am talking about the strong-arm work in education. Some people will not or can not read the county papers. One of the recent violations was by a man who could not read nor write his name. He depended on others. He was told the quarantine expired November 1, when the proper date was December 15. It must be our part as inspectors to know how to get the information to every man who has a cow. We must put a big red poster upon the barn when a place is quarantined. We must put posters upon the quarantine line, in the court-house, and in every suitable place. Publication is cheap as compared to delay in enforcement of the law.

INTERSTATE LIVE-STOCK ASSOCIATION.

Doctor LUCKEY. I wish to take advantage of this occasion to announce the meeting of the Interstate Live-stock Association at Jamestown, Va., some time in the latter part of next summer. I think that if this meeting here to-day has demonstrated anything it is the fact that the officers of the various States are too far apart—working in too many directions—and I believe that the association I mentioned should be made a permanent one; it should be attended by representatives of all the States, and should be taken as authority on matters of sanitary legislation and on contagious diseases. I promise you that I will help to arrange a program for the next meeting that will be of especial interest to all the States. I want to make this suggestion. There are thirteen States interested in the extermination of ticks; there are other States not interested at all, but some of them are interested in breeding cattle and in the subject of tuberculosis. There is going to be a lot of money expended in controlling tuberculosis, and those who expect the northern people to help pay for the extermination of ticks will in return have to help the northern people pay for eradicating tuberculosis. I hope that you will all attend the meeting at Jamestown in 1907.

REPORTS FROM STATES.**ALABAMA.**

Doctor CARY. This year the work has been extremely hard. The Bureau has furnished the entire amount of money for that work. I was promised by the State authorities, before Congress appropriated the money to cooperate with the different States, that they would authorize a like amount, but when I put the question up to them they refused. Doctor Melvin took up the work, and we started in two counties. We had no law, and what we have done has been largely along the line of education, in connection with the farmers' institute work. With one inspector in each county, and with what work I could do, we have accomplished something in the line of education.

ARKANSAS.

Doctor LENTON. The work has been a study of existing conditions rather than aggressive measures in tick eradication. If we can get a good idea of the conditions affecting this subject, we shall then be able to take effective measures at a later date. The inspectors in Benton County unfortunately could not get over the whole county. About two-thirds of it was inspected. All told, 77,474 cattle were inspected; 75,993 were clean and 1,481 ticky. This gives a little less than 2 per cent of ticky cattle in the northwestern county of Arkansas.

Probably this county, being next to Indian Territory, gives a far worse showing than the counties east of that in the northern tier of counties. Probably there will be some counties in the northern tier which are completely free of *Boophilus annulatus*. In Washington County the work was begun too late to form any definite idea of the amount of tick infestation there. The number of cattle inspected was 2,003, with 903 ticky—45 per cent. I do not think this is a very fair indication, as only four townships were gone over, and those near Indian Territory. The greater part of the infection in northern Arkansas comes from the Indian Territory. Other small centers of infestation are due to shipments of cattle by rail from the Territory to the States through Arkansas, as for instance where the Kansas City Southern crosses the Frisco line. There cattle are unloaded from one system for reshipment on the other. Thus small centers of tick infestation are created.

It seems to me that it would be a very great incentive to work in tick eradication if our northern tier of counties were allowed inspection all the year round. Possibly excepting Sharp County the whole northern tier of counties might very well be open for inspection the year round.

FLORIDA.

Doctor DAWSON. As I said a while ago, Florida has not done anything in regard to tick eradication. We look upon the tick as a necessary evil. All the work which has been done has been along the lines of education—publication of bulletins and inoculation of cattle against Texas fever. We have quite a number of men who know all about ticks and the trouble they cause, the loss to cattle in flesh and milk, and so on; but the State is not ready to take up the question of eradicating the tick. At least there has been nothing done yet, and you know how long it takes to do the preliminary work of eradication. However, there is no good reason why it should not be done. This is the first public recognition Florida has made of the cattle tick, and I think it would have a big bearing upon the question of taking up tick eradication if I can get a good report of this meeting before the board.

We have powers of quarantine. I frequently quarantine animals, but I have exercised the power only against hydrophobia and glanders. We have not the power to destroy any animal, but we can quarantine them, which is nearly as effective. The right to quarantine has never been questioned. We just put it in the hands of a deputy sheriff, and if he does not enforce it we have a man who will. Florida has rigid laws in regard to public health, and the people are more or less expectant of things happening to them in the way of disease. When the State board of health was first established, being a new thing, there was more or less shotgun talk in the State in regard to the en-

forcement of the laws, and the people have learned to respect our public health laws; and all the laws concerning the diseases of animals are embodied in the laws of the State governing the public health. I hope at a future meeting that I may be able to report something which has been done.

GEORGIA.

Doctor PAYNE. The work in Georgia did not commence until late in the season, the first active work being done the last week in September. The force consisted of four Bureau veterinarians and ten agents appointed from the different counties in the State. The national inspectors worked through cooperation with the State inspectors. The work was started in the mountainous counties in the northern part of the State, and, while the results of our work were not as satisfactory as we had hoped at the start, I think we have really accomplished some good. The seven counties in which the work was started are adjoining the three which are now outside of the modified quarantined area. They are hard counties to work in. Four of the counties have no stock laws of any kind whatsoever, so we practically have the same condition of affairs as they have in Texas or California, or any other open-range territory. We have an open-range country, and what makes it worse is the fact that the cattle must be taken off that open range and kept in close confinement during part of the year. Some might think that is a good time to rid the cattle of ticks, but on account of mild climatic conditions in Georgia it has been positively ascertained that the ticks are carried through the winter in sheds and other protected places. In other words, the infestation is kept in the protected places during the winter and is carried back to the open range in the summer. From the best knowledge I have I do not believe that the infestation remains on the open range in the high pastures in the State of Georgia. From the first of October or the middle of November until the first of April the next spring the cattle are not allowed to go on the open range. Infestation does not show itself in the spring, nor until along in the middle of summer. There are a few cattle kept in protected places that have ticks on them the entire year, and they have at least one crop of ticks during the winter season. For that reason we have a rather hard condition to combat in Georgia.

My views on a number of things are somewhat opposite to statements which have been made here to-day. But perhaps somebody can enlighten us, so we can better combat the conditions which prevail in my State. There has been a great deal said about education. Education to a certain extent is undeniably a good thing, but you may call upon a stock owner and find his cattle infested, and quarantine them, and spend all the time that you think is necessary to

enlighten him, to the best of your knowledge, on every point. Return to his premises in a week or ten days, and you will find that no effort whatever has been made to follow the instructions. You may talk to him again, and come back in two or three weeks more and find the same condition of affairs. After you have called upon this stock owner three, four, or five times, I think the time has come to stop your education and pursue some stricter measure. That is the state of affairs in a number of counties in our State. I am glad to be able to say that in some of the other counties, where we have a better class of citizens, we find it easier. In three counties we have stock laws, or what are known as no-fence laws; that is, there are no fences around the crops; but even in those counties the cattle are found at times on the highways. We have accomplished considerable good in those three counties, and I believe that if the work is carried on and a close supervision maintained up to the first of July or August at the outside, we can eliminate the tick from those three counties.

Doctor CARY. I would like to ask what percentage of men he finds who will not do anything after these visits.

Doctor PAYNE. We can not apply the rotation of pastures in those open-range counties, consequently that does away with the rotation of pastures. I can safely say that in the four counties with 15,000 cattle in which the cattle owners have been instructed to pick and grease their cattle, there are not 100 cattle that have been thoroughly cleaned. It has been stated here to-day that that is one way to eradicate ticks—to thoroughly pick and grease—with which I concur. But I do not find one man out of a hundred who will thoroughly grease or pick the cattle. On reinspections, where we expect to get the best results, we find that prominent men, whom we expect to assist us in the work, have not picked their cattle clean and the greasing has not been thorough.

KENTUCKY.

Doctor EISENMAN. Geographically Kentucky is so situated that if Tennessee would take care of itself Kentucky would get the benefit. In former years we had a good deal of Texas fever, this being due to the irregular handling of cattle at the Bourbon Stock Yards, but since we have had a corps of efficient inspectors at the yards we have had no recurrence of Texas fever, with the exception of last year, when I think there were in all three cases, the infection being introduced from the slaughterhouse.

Kentucky has the best of laws, I believe, for the control of infectious diseases in the human family and in cattle. They are operated under the immediate direction of the State board of health, and the work is done effectively. The counties of Clinton, Wayne, and Pulaski have been in quarantine for five or six years, but I never had

the pleasure of making a visit to those counties, for I could never get the county officials to recommend that there was anything there requiring my services. In cases of that kind we fall back on the Bureau of Animal Industry. We are very willing to delegate the authority to exterminate the tick.

Personally, I am of the opinion that this body should go on record as favoring some suitable laws, such as Mr. McCabe suggested—something that will be uniform and, as far as possible, apply to all the tick territory. Whenever the cattlemen or some few of us who are interested in this work propose anything, we always meet with the same old cry—"There is somebody who wants a job." That kind of opposition is very hard to get over. We were successful in enacting a glanders law about five years ago, because fortunately the infection appeared at a place right in the immediate neighborhood of the best race-horse farms in the country, and of course that brought the best people to the legislature, which was in session at the time, and in less than twenty-four hours we had a very-suitable law. I do not know of anything that will operate so effectively to get proper State laws and appropriations commensurate with the amount the Bureau of Animal Industry is willing to expend as to make it known to the people that it is not a local matter but a national one and that it is absolutely necessary to have their cooperation.

I would ask Doctor Ellenberger to give us a synopsis of his report on certain counties. The State veterinarian, whenever an application is made to look up a suspicious case, is very politely informed that there is nothing there and his services are not required.

DOCTOR ELLENBERGER. In reference to the work in Kentucky, we first started by meeting the boards of health of Wayne, Clinton, and Pulaski counties. Pulaski County is really free of infection, but a little corner of it was left below the line simply for a shipping point from the infected territory of Wayne and Clinton counties, as there had to be some way out for these southern cattle. We started in the work by visiting these counties and meeting the county boards of health and as many stockmen as we could get together, simply to find out if they were willing to get together this year. The county boards of health were not particularly interested, and they were not willing to go ahead unless urged, so we got the principal stockmen to urge the county boards of health to take up the work. It took considerable time, and it was well along in August before we got Wayne County interested. In Clinton County they commenced at once by appointing one man to look over the county. By the time the Bureau got ready to organize, the county had appointed the magistrate of each precinct to take up the work as an inspector, and the Bureau put in as many men as were considered necessary. We were very much surprised to find that the northern part of Clinton County was generally

infected, and that the infection had extended into Russell and also Cumberland. That required more help, and we put more men in there than we at first thought necessary. But the counties came to the front readily, and Wayne County had two men on from the time the work was begun and four men part of the time. Clinton County had on five men a portion of the time and then cut down the number to two men—that is, in addition to the work the Bureau did. There was no trouble in getting Cumberland County interested, and that county employed two inspectors. In Russell County there was a very small section infected. Out of 37 farms in that section 7 were found to be infected or exposed. The cattle were running at large in that neighborhood. The inspectors reported that on reinspecting these farms as many as three or four times no ticks were found. I think we have accomplished a great deal. We have done better work in those counties than in similar territory in Tennessee. The county boards of health came to the front and cooperated very well.

LOUISIANA.

Professor NEWELL. Louisiana has no live-stock sanitary law under which the diseases of live stock can be controlled with certainty. We have not only Texas fever to contend with, but also charbon or anthrax. However, we have a crop pest law which gives the crop pest commission the power to make and enforce regulations to prevent the spread or introduction of crop pests. Our best lawyers, district attorneys, and the governor (who is ex-State attorney) construed that law in its broadest sense—that cattle are a crop; therefore a tick must be a crop pest. Our crop pest commission, therefore, can make regulations dealing with this as well as any other crop pest; and the statute that created that crop pest commission gave it the power to make all necessary regulations and do all things necessary to prevent the moving of any and all things whenever such movement might cause the spread of any crop pest. We can take hold of the tick with these regulations and incidentally we shall have taken hold of Texas fever.

In Louisiana I think we have undoubtedly the most heavily infested portion of the United States. You people, who are working along the quarantine line and in the mountain counties only, hardly know what tick infestation is. We have not established very many dipping vats in Louisiana, but nearly all we have established are used in tick work. The work was commenced along in 1897 or 1898, when Professor Morgan realized that we had conditions in Louisiana, with our humid climate, where the life history of the tick differed from what investigators found elsewhere. Professors Morgan and Dalrymple met with a very favorable reception on the part of the people. Bulletins Nos. 82 and 84 of the experiment station were issued last year and have already been exhausted. At the present time we are getting a great

many requests from the people for tick literature. We realize that the work must be educational. We can not go against public sentiment, and we are slowly getting the people to understand that here is one of the greatest problems that has ever affected the prosperity of Louisiana agriculture. We now have in different parts of the State men who are undertaking the eradication of ticks upon their own farms. Among the obstacles we have to contend with, perhaps the greatest is the objection brought forward by the man who eradicates the tick from his premises while his neighbors do not do likewise. We have no quarantine line to push south or west or east. We have to start somewhere, and, after establishing a small tick-free area, enlarge it. The question is to find the point and make the start. Even if we start on one man's farm he brings up this argument: "I do not want to free my cattle. Some one else's cattle will break in here and I will get a bad case of fever. I would rather keep down the ticks." This is one of the hardest things we have to overcome. We have the free range practically everywhere, and we have got to bring the people to realize that the free range must go. We have conditions in different parts of the State which vary greatly. We have rice, we have sugarcane, and we have great cotton fields; then we have the pine lands and the uplands. In north Louisiana you can find almost as many different methods of farming as in all the rest of the South.

Our crop pest commission has been doing work in cooperation with the experiment stations for something over a year. Our commission has spent already in the neighborhood of \$2,000, principally along the lines of life history and biology, and we have a few thousand dollars more which we expect to expend in this way; and we expect to get a good appropriation from the next legislature. Our work in Louisiana, I am glad to say, has been received very favorably, and tick eradication strikes the people as something worth looking into. Doctor Curtice has accused me of being a pessimist, but we are not pessimists in Louisiana. At the same time we do not want to underestimate the magnitude of the work which we have before us; and while we shall work faithfully and as long as we have anything to work with, yet for my part I expect to see Louisiana the last stronghold which will have to be taken by this army of exterminators; but by that time I think we shall have weakened the forces of the tick somewhat in that State.

NORTH CAROLINA.

Doctor CURTICE. In the two States that I have represented (Virginia and North Carolina) the work has been conducted very differently. We began very early in North Carolina; Doctor Butler was already doing excellent work in that State, and it seemed to be a good plan, at least for this year, for the Government inspectors to

overlook the work which had already been done in part. Five counties—Polk, Mecklenburg, Cabarrus, Davidson, and Forsyth—will, I think, be released from quarantine, and parts of McDowell and Rowan. Doctor Butler's system has been in the past not to release a county before he had confidence that not more than 12 herds would be left infected in that county for quarantine work the next year. He has merely adhered to the same rule in this instance, with the exceptions that in Rowan there may be about 20 herds next year, and in Davidson there are now 30 in one locality, but they will be reduced to about half. He has four other counties—Yadkin, Rutherford, Cleveland, and McDowell—on which he has been at work two or three years; and I think that Rutherford will not have 20 herds infected next year, Cleveland will have 30 to 40, McDowell perhaps as many, and Yadkin, which had 100, may have about 5. No new territory has been taken up by him this year. He has held out three counties—Anson, Union, and Stanly, east of the Catawba River—for work next year, and seven or eight on the northern boundary of the State contiguous to the area, which must be worked with Virginia.

The main part of the work in North Carolina has been done through local inspectors by Doctor Butler. Our men have worked there two months and a half and have made good progress, but, as Doctor Butler says, you can not do it in a season. There will be less infection next year, but the main part of the work is coming then. We have not gone into the counties in that State with any idea that the work of one season would educate the men or completely clear the areas. Doctor Butler's difficulty has been for some years in not finding enough infection in some of the northern counties. You have to hunt close to find the infection. For example, in Forsyth there were 3 herds in the southern part recently infected. I believe that if we had proceeded a month earlier in Forsyth County we might not have found infection in the southern part. It had been driven in from counties that were not quarantined against—Stokes on the north, in the group of counties in which he was working. The two tiers of counties to the east of Guilford are about in the same condition. We may or may not find infection in those counties, as it has been gradually decreasing.

OKLAHOMA.

Mr. MORRIS. The Bureau in its regulations last year provided for the movement of cattle from most of the counties in which we have made investigations this year. The Territory never permitted the movement of cattle out of those counties under those regulations simply from the fact that they are so much infested that we did not think it was safe; but the coming year we have asked for the same regulations. We think we have all the herds under quarantine and

such herds will be safe the coming year. When we make an investigation of a part of a county, locate infection and quarantine it, we immediately establish a subquarantine line to the east of that, so that no cattle can get in and reinfest it. That is a precautionary measure, and I think a very good one. It holds that county free from any infection from the outside. In the work we quarantined about 1,500 pastures. That gives you some idea of the magnitude of the work that was done in Oklahoma for this year. In the little talk I made before I gave the conditions there.

SOUTH CAROLINA.

Doctor KLEIN. South Carolina has no law which will enable the State officials to control the movement of cattle within the State. The only law we have enables us to isolate and quarantine animals that are visibly affected with the contagious diseases which are dangerous to life. Under those circumstances we have the right to quarantine a farm and make such disposition of the animals as the welfare of the community may make necessary. However, about a year ago I began in an experimental way, in cooperation with the Bureau of Animal Industry, to test certain methods of eradicating cattle ticks. I have only been able to give such time to this work as I could spare from my other duties. I have succeeded, however, in reducing the infection in Oconee County to about one-half. We have there now 5 areas of infection, and in these we have a total of 11 farms. On 3 of these farms the work of tick eradication was begun this fall. On the other 8 farms work was begun last fall but was not persisted in by the owners of the cattle. Having no authority to quarantine the cattle, I had no means of causing the owners to continue this work.

The greatest obstacle in the way of tick eradication in South Carolina is the small importance of the cattle industry. Very many men there have no cattle except the family milk cow, and very few of them in the State know anything about the Texas fever quarantine line. They do not know that they can not ship their cattle out of the State if they want to. It is only the few men who have herds of thoroughbred dairy cattle who have had orders from States north of South Carolina who have come into contact with the quarantine law and who are therefore interested in tick eradication. These men, however, are rendering great assistance in the endeavors now being made to have a suitable law passed by the legislature at its meeting in January. The members of the South Carolina Live Stock Association and also members of the South Carolina Agricultural and Mechanical Society, which two organizations include most of the influential men of the State, have appointed committees to draft a bill and present it at the next meeting of the legislature, and appear before the com-

mittee that may have it in charge, to urge its passage. The chances are greatly in favor of the passage of the bill with an appropriation of a small sum of money to take up the work.

TENNESSEE.

MR. KITTRELL. Tennessee has a law relating to communicable diseases among domestic animals, but, as Major Pettibone said, it is not thoroughly known among all the people of Tennessee that such a law exists. Although it has been preached from Memphis to Bristol, yet, like the Bible, not all men have heard of it or have felt that they need it in their business. This law is not altogether a perfect law; it has defects, but it has some force in that it has clothed the commissioner of agriculture of Tennessee and the live-stock commissioner with power to make rules and regulations governing the movement and the control of cattle, and it also provides that the boards of health of the various counties of Tennessee shall act under the direction of the live-stock commissioner and the commissioner of agriculture. We have assumed that we have the power to make these rules and regulations. We have assumed that we have the right to accept the propositions made by the Bureau of Animal Industry, and use for our benefit the appropriation lately made by Congress; and we made rules and supplements to our general rules, which I admit were of little value because there was so much of them that people did not read them.

It has been my custom since I have been in office to issue rules and regulations in conformity with those issued by the Bureau of Animal Industry, and I have distributed them to the boards of health. Each member of the board of health in every county in the State received copies, and we inclosed a copy of this law to every county clerk. In visiting these boards of health, to advise with them about the manner of taking up this work, I have asked them about the rules and regulations, and in many cases they have told me that they had not received them. I know that I sent them. They had never been opened, and thus had failed to do what they were intended to do.

I have made it a point during my administration to go over the State with the county institutes held under the auspices of the commissioner of agriculture. Sometimes these were very largely attended. In other cases only 40 or 50 out of a county attended, where there were possibly 2,500 voters. I presented this matter as best I could. Maybe out of that 40, 50, or 75 farmers there were some who came to learn how to grow wheat, others to raise some other crop, and comparatively few to learn anything about the live-stock industry, but I can now begin to see the fruits of that work. While a great many have not felt any benefit from this teaching, some have, and the ideas have been gradually disseminated.

Another thing that has brought about some education among these people has been a few prosecutions and convictions. We have prosecuted three this year, and have convicted all three. Prior to that we had prosecuted three and convicted them all, which was a great lesson to them. When this supplement was issued, and the agents from the Bureau of Animal Industry were commissioned by the commissioner of agriculture and the State live-stock commissioner to enter counties and to enforce rules and regulations for quarantining and disinfection, they were resisted for a while, but some of the counties which most stubbornly resisted are the counties that are most readily cooperating to-day; and I believe that that appropriation and that method of carrying on this work have been a godsend to Tennessee and will be to all of the Southern States that will avail themselves of it.

We had in Tennessee forty-one counties more or less infected and under absolute or provisional quarantine, but by hard work and by teaching the people we have been able to clean up some of this area; yet most of the results that have been accomplished are not due especially to any efforts of my own or of the inspectors but to the natural location and conditions. We have been able to locate, we think, all of the infection in the State and to fairly control the same. Having done this, we found that some counties were peculiarly located. For instance, a great part of a county would be exposed by an open range, while the other portion was in cultivation or covered with grass and under fence, and that part of the county would be free from ticks. The reason that they have not had relief is simply because the Government, or the Bureau of Animal Industry, did not have full faith and confidence in the people on account of their inactivity in helping to enforce the rules and regulations, and because these herds were exposed to the open range. Now the people who have learned the necessity of cooperating with the Government have appointed county inspectors, and have pledged themselves to cooperate with the Government and with the State and county authorities, and in that way have restored confidence. They have got in touch with one another and are working in perfect harmony, and the result will be, I think, that Tennessee will get about thirteen counties relieved in whole or in part after another year.

The result of this investigation shows—and a recommendation to that effect has already been forwarded to the Bureau—that six counties should be relieved from Federal quarantine for next year. That does not mean that no infection exists in any of them, because the reports show that it does, but the infection is confined, and the conditions are so favorable as to warrant the release from Federal quarantine, as it can be controlled by local quarantine. Outside of these six counties we hope to get partial relief in other counties—that is, get absolute exemption for a great portion of seven other counties, and in

two other counties we hope to have the quarantine made provisional or rather modified, so that cattle can be inspected and allowed to move upon a certificate.

We have gone along slowly in this matter. We commenced not knowing how to undertake the work. We were handicapped in two ways. In the first place, we did not thoroughly understand the life and habits of the thing we had to deal with. After learning that, we needed the cooperation of the people, and they did not understand. After giving them a more comprehensive knowledge of the nature of this thing we were handicapped on account of a lack of means to carry on the work.

This State appropriates \$2,500 for expenses. This does not include the salary of the live-stock commissioner, but is for the expenses of the inspectors to carry on this work. That is not sufficient for even the force we have, and this force was not sufficient to cover the area. We covered all the area we could, and by another season the same area will need re-covering; but this reenforcement by the Government has enabled us to cover nearly all the area along the southern boundary of the State.

TEXAS.

Doctor PARKER. The State has had three men actively at work in the investigations most of the time, beginning in the northern part of Texas about the 1st of September and in central Texas about the 15th of September. During a small portion of the time there has been one other inspector on this work. The regular quarantine force of the State for the enforcement of the quarantine line has been doing work of inestimable value in connection with tick eradication, because the enforcement of the quarantine prohibiting cattle from movement is the first essential of our work. If we allow ticky cattle to move there is no use in trying to eradicate the tick; so we can not say that the State of Texas has not helped. Much good has resulted from the work of these three inspectors as a result of their familiarity with the country and their knowledge of the people and of the ranch methods. The Bureau had ten men in the field a part of the time, but the number is now cut down to eight, I believe, and I am afraid it will be cut down some more. We have not had a large force, considering the territory we have had to work in. There are nineteen entire counties and portions of three other counties above the quarantine line in Texas that are more or less infected. One county, I believe, will run as high as 75 or 80 per cent infected; others run less.

In Childress County we have inspected 23 premises, covering 54,260 acres, with 7,875 cattle—selecting those premises which were most likely to be ticky—but we have found no ticks. The inspections were carefully made, and the cattle from many of these ranches were

inspected at various times through the summer, and at no time have ticks been found originating in Childress; so we have recommended that Childress be released from quarantine.

Cottle County has 6 premises out of 10 free of infection. There are practically no small farms. Ten big ranches constitute the county, of which 6 are free, covering 25,420 acres, with 4,140 cattle, and 4 are infected, comprising 154,600 acres, with 10,700 cattle. I believe we have gone over all the ranches in Cottle County. They were only slightly infected and on some of the pastures of the ranches no ticks were found. We expect to have Cottle County free from infection by June. The work was done on all of those ranches in Cottle County before the late severe weather, and in most cases the cattle have been transferred to clean pasture, leaving the infected portions vacant over winter. If necessary, extra line riders may be dispensed with. We have reasonable assurance of success in Cottle County, and if ticks are found next spring the ranchmen are posted and will dip as soon as they find them.

Hardeman County has 190 premises with 160,572 acres, and 17,596 cattle free from infection; 39 premises with 80,038 acres, and 6,004 cattle were infected. There are 6 dipping vats, including those which are in or to be put in as rapidly as the carpenters can be had to put them in.

Foard County is heavily infested; 5 premises, with 98,440 acres and 10,035 cattle, were found to be free, and 10 premises, with 68,940 acres and 16,335 cattle, were found infested. There are 7 dipping vats on the 10 ranches. Foard County is about half inspected. The balance will probably show about the same percentage of infection.

Wilbarger County is very generally ticky, but is being rapidly settled by farmers, and we have compelled the small farmers to clean up and show clean premises. We have just struck Wilbarger at the right time. Forty premises, with 28,290 acres and 1,399 cattle, are free from infection; 36 premises infected as far as reported, with 75,500 acres and 9,007 cattle. They have 8 dipping vats in or ordered in.

King County is another which we expect to show free from infection by June 30. There is a very small percentage of infection and it is light, and the pastures are not timbered to amount to anything, nor very rough. Nine premises, with 846,800 acres and 50,400 cattle, are free from infection, and 3 premises, with 19,640 acres and 2,800 cattle, are infected. One dipping vat is in and 2 more are to go in.

In Knox County everything so far as reported is infected. There are very few clean cattle in Knox County; 7 premises are infected, with 124,020 acres, 13,450 cattle, and 4 dipping vats. It will take them two years to clean these up.

The total inspections made in Texas show 315 premises, with 1,349,564 acres and 101,448 cattle, free from infection; 220 premises infected, with 2,582,883 acres, 156,110 cattle, and 69 dipping vats in or ordered in. In addition the live-stock sanitary commission has adopted regulations which will be of great benefit, and the commission will see that these regulations are strictly enforced. As these ranches have to depend on cattle alone for their income, uninfected localities like Sterling and south Mitchell counties have been allowed to drive their cattle over certain trails as southern cattle. That is to stop absolutely January 1.

There are some propositions from the heart of the tick country from people wanting us to take up the work there. These are only isolated cases generally, for of course a ranchman can not afford to raise cattle that are not immune, as long as he depends on the surrounding ticky country for a market for his stockers. He must find a market for tick-free cattle and establish that market before we can persuade him to clean up. I do not think it is advisable to clean up any locality below the line unless we can get the consent of every one in that locality. We must have the sentiment of the people with us. I have thought of asking the legislature to enact a law leaving it to a kind of local option, like the local option on the liquor question, so that whenever a certain number of the people shall apply for an election it shall be held, and if the people are in favor of compulsory measures they shall be put into effect.

VIRGINIA.

Mr. BROWN. The cattle in about two-thirds of the State of Virginia are infected with ticks. The southeastern portion of the State is infected, and it is the work of the board to try to educate the people up to improving conditions. We believe we have got on the right track, and this year we have received most substantial assistance from the Bureau of Animal Industry, enabling us to extend education among the people, and I think that work has borne valuable fruit. As I am simply chairman of the board and not immediately in touch with the work in the field, I shall be very glad to have Doctor Curtice occupy the rest of my time and tell of the actual work that has been done in Virginia.

Doctor CURTICE. In Virginia the work has been done in cooperation with the board of control, the boards of supervisors of the counties affected, and the inspectors—one for each district—appointed by them. These inspectors, about fifty in number, have worked for periods varying from three weeks to a month. Some individuals have continued their work somewhat longer in some of the infected counties. The Bureau force, cooperating, has varied from twelve men in the beginning to six or eight now. In this work the inspectors were sent

to a county where they met the local inspectors and talked with them and instructed them, in addition to the instructions that they had received from the State veterinarian in the duties of inspection. We found the best service where we began work together. One objection was that the supervisors, not having very much actual interest, did not want to put up the money to pay for local inspection over a considerable length of time. In some cases they thought they could pay \$150; in some \$300; but I think in none as much as \$500.

A decided advantage in that local inspection service was that good, reliable men were selected and that we were immediately in touch with the cattlemen. We were favorably introduced to the residents of the vicinity, and that counted for a great deal. It removed friction and helped us in our future work. The quarantine of cattle varied from about 15 per cent in some counties to none in one county, or an average of about 6 per cent in ten counties. We believe that 50 per cent of those quarantined are already disinfected, leaving possibly 3 per cent of infected cattle for next year, and 97 per cent to go at large. We have tried to impress the owners of the 97 per cent that they were prevented from going free because they held this small percentage of infected animals; or, in other words, that the 3 per cent of infected cattle were quarantining their 97 per cent. Some of them have come to look at the thing in a new light, and I believe mean business in maintaining quarantine on the infected herds. A certain number of counties have been laid out for work next year.

There has been something said about climatic conditions and natural surroundings favoring certain States. The northern limit of the tick area is bound to be favored by climate, but wherever there is free range there the ticks are, whether it is north or south. Where they have stock laws, where they change their cattle from place to place and have cold weather, there the ticks have been eradicated; and I think this results not wholly from natural causes but partially from the acts of men in handling the cattle.

Doctor KLEIN. I believe the roll call of the States has now been completed. We have one with us who, I think, can say something of interest on this subject who has not yet been heard from, and I, in common with some others, would like to hear from him. I refer to Mr. Dean from Kansas City.

The CHAIRMAN. We will hear from Mr. Dean if he will favor us.

REMARKS BY ALBERT DEAN ON THE WORK IN THE WEST.

Mr. DEAN. Our acquaintance with the tick dates back nearly thirty years, when the great droves of cattle originating in the great State of Texas had to find a market north and were driven over the trails from time to time as settlement moved westward. The prairies of the Indian Territory, as soon as the Indians became subdued sufficiently

to allow cattle to stop there to graze, were the great shedding grounds for ticks. Of course we did not understand it at that time. The cattle moved on a little later after they got their fill of grass. They moved into Kansas and eventually on into Nebraska, the Dakotas, and Montana. In the early history of the cattle business, while cattle traveled on foot by trail, Texas fever was never known to exist north of the central part of Kansas; but just as soon as they began to transport the cattle by rail then the fever broke out at the places of landing. It did not make any difference how far north they went, unless they reached some country where they had frost every month in the year.

When the Texas fever quarantine was inaugurated, Oklahoma was still the great grazing ground for the cattle. In our earlier experience we thought it was impossible for fever to hold over from one season to another. Such a condition never existed to our knowledge, and my acquaintance covered twelve years in the cattle business—from 1874 to 1886. I was continuously in the cattle business in what is now the northeastern portion of Oklahoma. During those seasons the grass was not grazed short; the timber was very sparse; the country would be swept every year by prairie fires from one end of it to the other, and instead of a low temperature and a cold winter eradicating the tick, it was in a large measure done by the fire. Just as soon as the country became settled and fenced up and the prairie fires stopped, the ticks apparently secured a hold, and they seem to be capable of great adaptability to different conditions and different climates, especially where they are sheltered. Consequently, when the Texas fever quarantine was applied to Oklahoma—I believe it was in 1897 when the first quarantine line was designated through the Territory of Oklahoma by the Secretary of Agriculture—we found the tick had secured a fairly good hold in that section. The western part of the Territory has a very much higher altitude than the eastern part, and we thought that cut a big figure. We found the tick secured a hold as far west as the 100th meridian and as far north at least as the 36th meridian, north latitude.

Tick eradication is not really a work of recent origin in the Territory of Oklahoma. The rules of the Territorial board and the work of the Bureau of Animal Industry having gotten the cattlemen interested in it, when they understood their position so far as the marketing of their cattle was concerned they set to work to clean up the cattle diseases, and the consequence was that the tick had been entirely eradicated from the counties of Day, Roger Mills, Custer, Washita, and Blaine before ever this recent eradication work set in.

At the point where the national quarantine line crosses the Mississippi River and the boundary line between the States of Arkansas and Missouri we first encounter a low-lying tract of land, commonly known as the sunken lands. It was probably once, according to

geologists, an old bed of the Mississippi River. The river has changed from some cause and left a lot of land which is very low. A great deal is covered by water a good portion of the year. This is in north-eastern Arkansas. That portion is free from tick infestation as a rule, while the ridges and higher points are infested with ticks.

On the original examination made of that country, about 1895, we found a large number of counties—the two northern tiers of counties of Arkansas—free from infection; but just as soon as a quarantine was established under Secretary of Agriculture Morton and a market made for the cattle the southern cattle from the lower White River and the Arkansas River moved up into those counties and soon infested a large part of them. They are hilly counties, in a large measure, and the ticks found a permanent hold, and a very large number of cattle are now infested with ticks. Beginning at the very northeastern corner, Clay and Randolph are reasonably free from infection now. I know of no permanent infection in those counties. The next county, Sharp, which reaches the boundary line between Arkansas and Missouri at one point, is grossly infested with ticks. The northern tier of counties, clear along the line, is practically free from infection until we reach the very northwestern county, Benton, that adjoins the Indian Territory on the west, and here there is no law—or if they have a law they do not enforce it—that prohibits the free interchange of cattle back and forth. The county is used for grazing—very largely free grazing—so that a farmer with surplus cattle in Arkansas takes his cattle over into Indian Territory to graze, and the Indian Territory cattle come in to find a shipping point.

The Kansas City Southern, or the Port Arthur route, runs down through the western portion of Benton and Washington counties, and the driving in of the cattle from the Indian Territory for shipping purposes has caused infection all around the shipping points. We have made a farm-to-farm canvass of that country and have located all the infected farms or localities. The inspector who made the investigation, being familiar with all those points, can inspect cattle out of that country with a reasonable degree of safety, because he knows whose cattle to let out. Therefore, if the State of Arkansas would pass the necessary laws and create the machinery to put them in force I would favor exempting the northern tier of counties, with the exception of Sharp, from the operation of the quarantine; that is, I would put them under special quarantine and give inspection the year round.

At the northwestern corner of the State of Arkansas the quarantine line turns northerly along the western line of Missouri to the southeastern corner of the State of Kansas. In that portion of the Indian Territory we have no county organizations, but the Department of the Interior, for purposes of recording land allotments, has designated them record districts, which correspond to counties. Now the

five northern record districts shut in all of the Cherokee Reservation that would lie north of the north line of the Creek Nation, provided that line was extended east to the Arkansas line. The country lying north of that line comprises the five northern record districts, which are under special quarantine. By amendment No. 6, referred to in Doctor Allen's paper, no tick-infested horses, mules, or cattle are allowed to be placed in that district at all at any time of the year except after being dipped in crude petroleum. This year about 10,000 cattle have been dipped and put in that country. That is tick eradication.

While we acknowledge that there are plenty of ticks in that reservation from year to year, yet when that becomes a part of the State of Oklahoma and gets proper laws we can go after those ticks; and I take it that the object of this work of the Bureau in prohibiting the introduction of any great infection there is to get ready for the time when we get a proper law.

I think it is not out of place right here to state that we have noted no serious effects on account of dipping animals in crude petroleum of the Beaumont variety, with which I suppose most of you are familiar—a low grade of oil, so far as refining purposes are concerned, and containing quite a percentage of sulphur and having an asphalt base. We have a similar grade of oil in the northern part of our oil district in Kansas that has an asphalt base but is lacking in the sulphur, and is a little higher grade by gravity measurement than the Beaumont oil. We have had good results when the Beaumont oil is used under moderate temperature conditions and the animal has a sufficient coat of hair to hold the oil. We have had no trouble in regard to our dipping. Our loss from shipping and dipping and everything else on those reservations to which this dipping order has applied has been less than 1 per cent. We handle the cattle in great numbers.

We now pass on westward to the Osage Indian Reservation, which comprises about a million and a quarter acres of land, that is, including the small Kansas reservation. Last spring a year ago the Department of Agriculture issued regulations prohibiting the introduction of tick-infested cattle into the Osage country until they had been dipped. About 90,000 cattle were dipped under that order. Of course it was opposed by the stock owners largely. They were afraid of it, and they had made their leases with the Secretary of the Interior before this order was out. A good many of them tried to back out and talked about throwing up their leases. The cattle, however, were in good order and the loss through dipping and from all other causes was very small. Some cattle are always hurt owing to the rough usage in handling range cattle; the cattle are wild and jump around. Another difficulty we met with was that the twenty-eight-hour law, so called, did not apply to the Indian Territory—or was not observed, at any rate—so that the cattle were kept on cars for a much longer period

than the time limit, and, being exceedingly thirsty, the first thing they did was to take a drink of the dip. We had gutters in the dipping pens, and the oil ran down the gutters and they sipped that oil, and it did not have a good effect on the animals. We think some of the loss was caused by the drinking. We had the nicest, sleekest lot of cattle I had ever seen. Some of them did not fatten as well for the next month. Besides, the shedding of their hair made the animals look as if they were thinner. This year we dipped 125,000 to go into that country, and have this fall put about 8,000 more into the Osage country.

The gentleman from Louisiana said they could not safely use the Beaumont oil in that State; but we can take the Louisiana cattle into Oklahoma and dip them, and we did take about 2,000 from north central Louisiana—that is, from Louisiana west of the river—up to the Ponca or Otoe Reservation, and we dipped them and they did well, and we killed every tick.

Our best inspectors and closest observers estimated that with one dipping under proper conditions, just at the right time of year, when the animal has enough hair to hold the oil, and the oil is of sufficient consistency, not one tick on a thousand animals will stay on.

Of course, we have not succeeded in eradicating all the ticks from the Osage country, for the reason that the Indians do not come under our regulations at all. The Indians have a few cattle, and they have free access to those pastures. While there is nothing in the lease from the Interior Department that gives an Indian any right at all, yet he does as he pleases. He gathers up his cattle at round-up time, and the white man always manages to help him out; and they continually keep those pastures infested with ticks. Of course, that country will come in for allotment presently. Burning would be a good disinfectant for that country, and we have contemplated taking this matter up with our Department and trying to get the consent or backing of the Interior Department to burn that country. We believe it would be a good step toward the eradication of ticks there.

West of the Osage country we reach the Arkansas River along the line, and the rest comes under the Oklahoma regulations. Texas is the only other State that belongs to the Kansas City district, and Doctor Parker will answer for that.

Doctor Allen, the Bureau inspector in charge in Oklahoma, who could not attend this meeting, has sent me a paper, which, if you will allow me time enough, I will read.

WORK AGAINST TEXAS FEVER, WITH SPECIAL REFERENCE TO OKLAHOMA.

By LESLIE J. ALLEN,

Inspector, Bureau of Animal Industry

[Read by Albert Dean.]

The battle with ticks, more for the prevention of their encroachment on free territory than for their eradication, has been waged vigorously—largely by proclamation—ever since the relation between this parasite and the fever has been well understood. I say “by proclamation” for the reason that legislative bodies have never seen fit to enact such measures and provide such appropriations as would give to the live-stock sanitary boards the necessary authority and means for the employment of an adequate force of inspectors even to prevent the gradual invasion of formerly clean territory by infection, to say nothing of carrying into the enemy’s country a war of extermination. It can hardly be said, however, that the legislatures have been derelict in their duties to the people, since public opinion, the force that must ever be brought to bear to obtain the enactment of measures intended for a great public benefit or reform, has not given voice to a demand for such legislation. Neither can it be maintained that the public is to an unpardonable degree to blame, for it has never seemed to appreciate properly the relation between the tick and the fever and the fact that to this alone is due the exclusion of their cattle from the northern markets. The owners of the infested herds in a community—suppose, for example, the infested herds are but 10 per cent of the whole—do not seem to recognize the fact that it is due to their harboring of the ticks that the owners of the other 90 per cent are deprived of the privilege of the northern markets. And, strange to say, neither does this 90 per cent seem to be fully alive to the cause operating to that end. While most will agree that it is desirable to be rid of the ticks, still a proper realization of what they are being deprived of would make extremely uncomfortable the position of the man whose disregard for the rights of others is shown by his indifference.

In Oklahoma, too, a Territory the citizenship of which is composed of people from every clime, there is found among the people hailing from those States where it was once believed the quarantine line was established from ocean to ocean for the purpose of eliminating Southern cattle as a factor in the northern markets, a well-marked prejudice against giving credence to the established relations between the tick and the fever. We have another element scarcely less potential, and that is the man from the North who comes to Oklahoma deaf to advice, and fully believing that he, by reason of his fancied superior knowledge of animal husbandry, will be able to demonstrate that ticks have been unjustly blamed for loss from so-called Texas fever. Occasionally one of this type chances to locate his susceptible cattle where the results make a convert. A new convert made in this way is usually very enthusiastic. We also have the pessimist—the man who believes there is no use trying—that ticks originate spontaneously, or as a kind of a budding process from “black-jack” timber.

Undoubtedly this diversity of opinions and apparent want of information is due in a great measure to the lack of a sufficient number of veterinarians and others who are able to explain these matters in such a way as to make them plain to the stockman.

As yet we have had but little trouble with active opposition, and I must say that of what we have had much has been due to a lack of diplomacy or tact on the part of the inspectors. There are comparatively few owners who will actually resist the operation of such measures as are found necessary to accomplish the desired end, providing it can be made plain to them that the measures are necessary and consistent, and that the end to be gained is to their ultimate interest. It is true that there are some who are reluctant to suffer immediate and real inconvenience for the promise of ultimate reward.

In the counties bordering on the quarantine line, where the work was to be begun, it was known that infection existed, but to what degree and its exact location could only be determined by making a systematic canvass. This was done with the twofold object of locating the infection and at the same time preventing as far as possible its further spread by restricting the movement of infested cattle. We therefore organized the force in squads of six, each employee being provided with a mount of two horses. We procured teams, wagons, tents, etc.—a complete camping outfit suitable for our needs. One of the inspectors was designated as manager, to whom all rendered obedience. He thus in a great measure became responsible for the action of all. In this way a nearer approach to uniformity of methods is possible.

One of these squads would start at a given point, say, in the morning, and the managing inspector would designate two inspectors for each of the section lines, the farms on either side of which were to be canvassed. The cook, in charge of the wagon and the extra horses, would be directed to proceed to a certain point previously agreed upon—some 2 to 4 miles ahead, depending upon the character of the country—and make camp and prepare our midday repast. This would be continued in the same direction through the entire county, or to a point agreed upon, where the outfit would double back, taking another 3-mile strip to one side or the other of the one that had just been worked.

The examination of the cattle was usually made in the pasture where found, which was not a difficult matter as a rule, as inspectors who have worked in the West as long as two years or more, if they are made of the right material, become reasonably proficient with the rope, while the class of employees designated as agents in tick eradication, who make up the majority of our force, are men whose recommendations were based, among other things, on their proficiency with the rope. The finding of the cattle in the pasture is the greatest time-consumer, for of the territory canvassed this year probably two-thirds is covered with a dense growth of "black-jack" timber. The ordinary farm in the timbered localities is a 160-acre tract, with some 40 to 60 acres cleared for cotton and corn, the remainder being in the natural growth of stubby timber, which is the pasture for, on an average, 10 head of cattle. Often an inspector will be as long as two hours finding as few as two or three cows on one of these places.

We do not, as a preliminary to making an examination, hunt up the owner to obtain his consent, for such a procedure would occupy too much time, not so much in getting his permission to go on his premises as in explaining the purpose of the crusade and, possibly, in the engagement in a useless controversy on the relation between the tick and the fever. And it might be in order here to pause and remark that not all our employees, even among the professional class, are properly equipped to take a creditable part in such arguments. The discussion of this subject, as far as possible, should be left to the "follow-up" man, who should be selected not only for his special fitness for making convincing explanations of the relation between the tick and the fever, but to advise ably with the owner regarding the best method to employ in his particular case to free his pasture from infection.

When an inspection is made the number of head of cattle, the description of land, and the name and address of the owner are noted. If the cattle are infested with ticks a quarantine notice, the form of which is supplied by the Oklahoma live-stock sanitary commission, is served on the owner.

[Mr. DEAN (commenting). This is right in line with a remark I made in regard to the tick eradication not being new to Oklahoma, because that territory has a very efficient sanitary law and they have been pushing the tick back from counties that were only partially affected for five years. It has been successful in eradicating the ticks from five counties entirely. Those counties are Day, Roger Mills, Custer, Washita, and Blaine, and in partially eradicating them from Canadian County, but we never were entirely successful on account of the rough country brakes along the south of the Canadian River, a tract of cedar brakes from which we never have been

able to eradicate the ticks by this method of quarantining the premises and trusting entirely to owners to disinfect their cattle.]

This notice apprises the owner of the fact that his cattle are infested with ticks, of which he, in most instances, is fully aware; and he is thereby forbidden to move or allow to be moved any cattle to or from his premises, and is further directed to disinfect them by dipping in or making applications of crude petroleum as often as every twenty days until no more ticks shall appear. This form of notice was not gotten up especially for the tick eradication work, but is a form that was in use before this work commenced. The matter of most importance in this order is that it is a legal notice to the owner that his cattle are infested with ticks and that it forbids the movement to other premises. The order to disinfect will, in most instances, be inoperative unless an inspector makes frequent visits to see that that provision of the order is complied with. The failure to disinfect properly or to employ such measures as are recommended for eradication is not, in many instances, due to open opposition or even to disinclination, but rather to lack of a suitably equipped man to direct his efforts.

A tabulated report of inspections made is forwarded periodically to the Oklahoma City office, where it is recorded. A map is prepared in the office showing the quarter-sections and even smaller tracts—where land is so divided—and the number of cattle thereon. The quarantined cattle are entered on this map in such a manner as to make such herds readily distinguishable from the free. Besides this, each employee while in the field makes his report in duplicate on a blank form provided for that purpose for every individual inspection made. To make this report requires, on an average, an hour or more every day, and this has proven the most distasteful feature of this work. During the season, up to November 1, 10,589 separate inspections had been made by the force engaged in tick location. This covers 114,832 head of cattle. Of these, 1,317 herds, covering a total of 16,927 head of cattle, were found infested. The average number of inspections per day per man was about 12 herds. This average would have been far exceeded had it not been for the unusual amount and frequency of the rainfall. Of the total number of herds inspected a fraction over 12 per cent were found infested.

Regarding actual eradication, the work has not been rewarded with that degree of success that might have been expected. We were handicapped early in the season by being unable to induce dealers to handle oil in sufficient quantities for disinfection purposes. Again, not enough men were assigned to the following-up work. Of course it was only in that area in which the infection was located prior to September 1 that any hopes were entertained of freeing premises of infection. It is impossible at this time to determine with any degree of certainty how many premises have been freed from ticks. We believe, certainly, that on a great many premises quarantined no infection will appear next year. I base this on the fact that, on the reexamination recently made by our inspectors, at least 30 per cent of the herds were found free from ticks. We expect, however, to continue next year to treat all these places as infested.

We are expecting some good results from the quarantining of about 1,350 premises (up to this time), thereby preventing further spread of infection by confining the cattle to one place until they have been freed from ticks. It has been ascertained that in those localities, where not to exceed 10 per cent of the herds are found to be infested now, not longer ago than four to six years the infection was general, and that premises were freed from ticks by greasing the cattle or, if but a few head, by keeping the ticks picked off, but more often this result was obtained by the burning of the pasture (often accidental, it is true) or by permitting it to remain idle a part or a whole of a grazing season, with no thought of destroying the ticks.

[Mr. DEAN (commenting). We have learned some good lessons by the burning of pastures accidentally, and it rather backs up my previous statement that the grazing country, which comprises about 3,000,000 acres of land, formerly known as the Chero-

kee Outlet, was disinfected annually, prior to the time it was occupied as a grazing country, by the tremendous prairie fires that swept it from one end to the other, as at that time the bodies of timber were rather thin, and a big prairie fire would jump an ordinary stream from burning trees or bark. We had some gales and the danger to life of man and beast was great, but such tracts were always disinfected. Last winter a year ago an accidental fire broke out in a portion of the Osage Indian Reservation, which has been used for probably twenty-five years as a grazing ground for Texas cattle. It is the only large tract in either Oklahoma or Indian Territory in which the land has not yet been allotted, and it is leased for grazing purposes in large bodies by the Secretary of the Interior, or under his regulation, and for two years we have been applying the tick eradication rule to that territory. As I said, an accidental fire got out and swept several large pastures, and that fire-swept tract proved to be free from ticks the next year. I think, therefore, that fire is a good disinfectant if we could use it, but unfortunately we can not use it in a fenced country.]

No small per cent of the infection found was of recent origin and traceable to infestation this year by the accidental intermingling of cattle in adjoining pastures or by the introduction of animals—horses or cattle—from more distant infested pastures. The instances of seeming self-disinfection, which may be classed as accidental—that is, the instances of premises becoming freed from ticks with no systematic effort on the part of the owner—assume a place of no small importance when we come to take into consideration the fact that they have more than balanced the numerous instances of infection traceable to the heretofore unrestricted movement of infested cattle, and emphasize the benefits which may be expected from a strict enforcement of the local quarantine. A rigid enforcement of local quarantine, thereby denying to infested cattle the use of the public highways, will develop a factor that will operate in our favor. It is now being brought forcibly to the notice of different owners that they are absolutely deprived of a market, local or interstate, for their cattle until they are free from ticks. This factor is of the greatest importance, of course, to the owners of the larger herds, the local product of whose farms is put into their cattle, thereby making their marketing their sole means of existence. It is believed that this restriction will make it comparatively easy to induce them to make a concerted effort for eradication next spring, at which time in the year disinfection will certainly be more economically effected.

We have had some violations of our quarantine orders; that is, cattle have been moved from quarantined premises without permission. A few of these violations have been wilful and malicious, but it is believed that the great majority of these could have been obviated had we had a sufficient number of inspectors conveniently located to visit these quarantined places as often as every three weeks.

Many of the owners of the larger infested herds have, by reason of the probability of the reappearance of the infection next year and their still being held under quarantine, signified their intention of disposing of the bulk of their herds between now and spring. It is the purpose then to prohibit, under Territorial (or State) authority, the introduction of other cattle to these premises until such premises have been declared free from the suspicion of infestation. The use next year of public pastures quarantined this year will in most instances be prohibited until such time has elapsed as will suffice to destroy the ticks by starvation.

The movement of horses has been mentioned in this paper as a means of spreading the infection. I have known several sanitary officials to speak of this as a danger which is merely possible but too remote for serious consideration, while others prefer to remain silent on this subject. I am not aware that any State or Territory has placed any restriction on the free movement to or within its borders of tick-infested horses. In this the Bureau of Animal Industry seems to have taken the lead in Amendment 6 to Rule 1, Revision 1, under date of October 1, 1906, which regulation, however, affect only a small part of Oklahoma and Indian Territories. This silence and the apparent

reluctance to attempt to restrict the movement of infested horses is due, evidently, more to the want of a satisfactory solution to offer than to a lack of apprehension of the danger. I have in mind a number of cases in the Territory in which all indications point to the ticks being introduced on horses. As recently as last month two cars of tick-infested horses were shipped from a Texas point to Watonga in Blaine County, Okla., a county that for several years has been classed in the safe area. A stockman living there wrote me regarding this incident and mailed me some of the ticks. I was powerless to take any action in the matter except to pass the responsibility up to the secretary of the Oklahoma live-stock sanitary commission, for the reason that Blaine County is not in the area covered by the Bureau amendment referred to. These horses were to have been peddled out over the country, probably going to as many as fifty different places, but I have just learned that Secretary Morris, acting without precedent but by authority of a statute giving his board power to take such action as is necessary to protect the live-stock interests of a community, succeeded in quarantining these horses before they had been sold.

In Greer County, Okla., the horses brought in annually by cotton pickers from Texas are a prolific source of infection. It is unaccountable why some State authorities refuse to admit cattle from an infested pasture, even after dipping and certification, and then admit horses from the same pasture, apparently without a thought of the probable consequences. Then if any infestation appears along the border it is said to be due to the lack of proper patrolling of the quarantine line! So long as there is an infested area and a zone north of it in which ticks may accommodate themselves, just so long will there be cases of infection of apparently spontaneous origin unless there can be some effective measure devised to limit the movement of infested horses.

In the disinfection it is believed that in the majority of instances the periodical application of oil, either by hand or by dipping, will be found the most practicable. However, it is intended to employ such methods as will in each particular case seem to promise the best results. To carry on properly the follow-up work will require one man for every forty or fifty places under quarantine. For the some 1,350 premises now under quarantine it will require for this work alone as many as 35 men, commencing as early as April 1. Many of these men can, if the work under their supervision is effective, be released by August 15 to take up like work in the area that will have been covered by that time by the location force.

The securing of suitable men for eradication work is certainly a matter of the very first importance, and to secure a large number of men that can meet and carry weight with the farmer and stockman, enlist their interest, and enforce necessary measures on the unwilling, will be found exceedingly difficult. It is only men possessing such qualifications, together with energy, alertness, and honesty of purpose, that are of any service. Without such qualifications a man is not only of no service, but his presence is a positive menace to the success of the undertaking.

DISCUSSION.

Mr. MORRIS. Since we began enforcing Indian quarantine it has been the practice in my office to send out a notice every year to every person to burn his pasture, with the alternative that if he does not burn we will put the matter into the hands of the sheriff to look after at his expense. Of course that will still be our plan this year. All those pastures which are quarantined this year and last year receive the same notice this year to thoroughly burn and disinfect.

I also want to emphasize this point in regard to ticky horses in Blaine County. Doctor Allen transmitted correspondence to my

office, and after looking carefully over the statutes I figured we could handle that case, and immediately sent inspectors to the neighborhood and got those horses before they were disposed of. They were trailed from the railroad station about 90 miles, but we have got those horses in quarantine all in a bunch, and as far as the Oklahoma board is concerned we shall make a regulation this coming year requiring tick-infested horses to be dipped or disinfected in some other manner before being brought into the Territory; but if we can have a Bureau order behind that it will be better, and we hope we can get it.

Doctor CURTICE. May I ask at what time Mr. Morris asks to have the burning done, or whether he expects the ticks to be hatched out by that time?

Mr. MORRIS. At the time the tick is hatched the grass is too far along. I recommend the burning just as late as possible before the grass starts—that is, so it will not injure the grass too much, say not later than the 15th of April. I do not recommend burning at this time of the year. I think it better to burn later.

KEEPING RECORDS OF INSPECTIONS.

Doctor CURTICE (to Mr. Dean). What system of keeping records of infected cattle have you?

Mr. DEAN. We make up regular reports along with plats. We have the Department furnish us with little township plats on cardboard. Our country is all in sections subdivided into quarter sections. We have little plats for memoranda and have them perforated. The plats are about 3 by 5 inches and show the township and section, with a little space at the bottom for remarks. It was Doctor Allen's idea to keep a record by plats.

Mr. MORRIS. After the inspectors got a little more used to the work of making out reports they did not kick so much about it. It was, of course, a little extra work and wearisome after a hard day in the saddle. They did kick a little, but in the latter part of the season they seemed to catch on.

Doctor CURTICE. Perhaps our experience in keeping records of counties may be of some help. It is not perfect, for I see many things to be corrected. I adopted the card-catalogue system, and when a herd was inspected kept a record of that inspection from the inspector's reports on a 4 by 6 inch card. I kept the records of a county by themselves in alphabetical order. After a county was inspected I took a list of the places on those cards and ordered the proper inspector to fill out a record of his inspection with the date below the first inspection. On some of these cards I have as many as five inspections, some of them by different men, and always a record of what the man intends to do and what he has been doing and the conditions found. By that process I have found that sometimes inspectors when they thought

they had records of the scattered herds had missed some. The record enabled me to give them a list that they must look up. It also gave me an idea of the temper of the men on the farms—whether they were actually doing what they said they would do and were making progress. I think that if the volume of work had not been so great I would have kept a record of the uninfected herds; but above all we should keep a careful record from time to time of these infected herds.

FEEDING SULPHUR, DIPPING, ETC.

Mr. RANSOM. The idea has been very prevalent all over the world, wherever there are ticks, that sulphur fed internally will prevent tick infestation. Several years ago the Bureau of Animal Industry took up that question in an experimental way. I do not remember the exact details of the experiments, as they occurred before my time, but the manner in which they were performed was somewhat as follows: Two lots of cattle were kept under exactly the same conditions in every respect, except that one lot received sulphur and the other did not. They were both exposed to tick infestation, and the result was that there was no perceptible difference in the degrees of infestation in the two lots. The people who are working on the tick question in South Africa have performed experiments of similar nature with similar results. It seems to me that the idea is simply a notion. I do not believe there is any basis in fact for the opinion.

There seems to be, however, some relation between the food of cattle, or rather the alimentary processes, I might say, of cattle and the tick. For example, there are certain opinions prevalent among the people that feeding certain fodder to cattle will result in the ticks falling off. We have made observations along that line at the Experiment Station of the Bureau at Bethesda, Md., where cattle which were very heavily infested with ticks were fed at stated times of the day with alfalfa or some other fodder of that sort, and it was found when the feed was thrown into the manger and the cattle began feeding that the ticks would begin to fall from them like raindrops. Before the fodder was put in you would hear a tick fall off occasionally, but as soon as the fodder was put in the ticks began to fall off about like that [tapping on the table]. Of course those ticks were about ready to fall anyway, but we may suppose that they were waiting to fall in a place where the chances of reinfestation of the cattle later would be as good as possible, and that some slight change of unknown character which occurs in the skin of cattle while actively feeding acted as a stimulus to the ticks and caused them to loosen their hold. This peculiarity of the tick may be explained on the theory of natural selection and evolution.

Doctor KEANE. In our California work with the various crude oils in hand dressing and dipping cattle very few of our oils contain sul-

phur, and some of them have just a slight trace. We find that the oil acts mechanically, and our oils destroy ticks just as well as crude petroleum. In fact, we used fish oil and destroyed ticks. I believe that the action of the oil upon the ticks is purely mechanical, and I think the sulphur has no effect at all. The sulphur being a constituent of the oil may probably prevent a later invasion by ticks, but as far as the destruction of the ticks is concerned I do not think sulphur has any effect at all.

Doctor CURTICE. I wish to add a little testimony in regard to sulphur. We have been using 20-per-cent oil emulsion upon the ticks, and it kills the ticks as well as the oil does, although we may judge that there is only about 2 per cent of sulphur in the oil. I think that the emulsion when forced into the hair spreads more evenly over the ticks, and that a thin film closes around the tick better possibly than if the oil were obstructed by matty hairs or otherwise; but if one does the work, so does the other. They are both alike in that respect. Of course the work of greasing is detested by the people, and if there were a substitute it would be used much more freely, I think, although more care might be required in handling it. There is a difference of opinion as to how the oil kills the ticks. One view is that there is something poisonous in it which prevents respiration.

Doctor PARKER. That is not the whole cause. The emulsion is in very small particles which penetrate the spiracles more readily than the oil will do.

Mr. RANSOM. I believe that is a very good explanation. Of course it is very doubtful if every tick in the application of the oil itself is entirely covered with a film of oil; undoubtedly a great many of them escape being entirely covered, while in the use of the emulsion a large proportion of them would probably get more or less of the oil into their spiracles. Ticks, as a general rule, are very resistant to poisons; that is, they withstand the effects of poisonous substances that kill other parasites very quickly.

Doctor PARKER. The skin of the tick is not very absorbent?

Mr. RANSOM. No.

Doctor KEANE. This calls to my mind a number of dippings which we made with the lime-and-sulphur dip, with approximately 16 pounds of lime and 20 to 25 pounds of sulphur to 100 gallons of water—the regular scab dip. We dipped quite a number of cattle with that mixture, and it was not effective in the destruction of ticks. There is plenty of sulphur and lime, and we found a number of owners of infected ranches were using this dip, because it did not affect the cattle to any extent. The promulgation of theories about the dipping of cattle with sulphur and lime, or any proprietary medicine, always causes a setback in the work; but we found that the use of oil is effective in destroying ticks.

Doctor KLEIN. I would like to ask Mr. Ransom if it has ever been determined in what form the sulphur exists in Beaumont oil.

Mr. RANSOM. As I am not a chemist, I would not like to answer that. I think we made in our Biochemic Division a good many analyses of oils from different parts of the country, and undoubtedly they have the data in regard to the compound of sulphur which occurs in the oil.

Doctor KLEIN. The reason I asked that question is this: Doctor Nørgaard, who conducted quite an extensive series of experiments testing the various dips for destruction of ticks on cattle, gave it as his opinion after the conclusion of these experiments that sulphur in some oil was the most destructive substance to ticks. I know nothing as to the details upon which he based that opinion. The thing that first drew the attention of the Bureau of Animal Industry, I have been informed, to this crude Beaumont oil, was the fact that it contained a greater percentage of sulphur than could be incorporated mechanically in any oil; that is, there is more sulphur in crude Beaumont oil than you can get in cotton-seed oil if you undertake to mix in some of the flowers of sulphur. The form in which the sulphur exists in the crude Beaumont oil is, I think, a point that will have considerable bearing on the influence of the sulphur upon the tick. If the sulphur is in soluble form, or in a form which will permit it to penetrate the tick, it is certainly then in a condition to do more damage to the tick than if it is in insoluble form or in a condition which will not allow it to penetrate the tick. I have a great opinion of Beaumont oil in the destruction of ticks. I recognize that it is a smeary mess; nevertheless, it does the work. In so far as heat is concerned, I have dipped cattle in Beaumont oil when the temperature was 100 in the shade, and by placing the cattle under a shed they did not suffer any ill effects from the heat. If you dip cattle in Beaumont or any other oil and expose them to the sun the oil will absorb a great amount of heat from the sun, and that is what elevates the temperature of the animals. On the other hand, you will find that crude Beaumont oil in winter time will make cattle shiver. I think that with proper protection from the sun there will be no bad results from the effect of heat on cattle after being dipped in Beaumont oil.

The CHAIRMAN. I would be glad to hear from Doctor Keane, of California. He said they used an inch or two of oil on water.

Doctor KEANE. The dipping vats that we used in California are about on the same plan as the Fort Worth vat. There is usually a swim of about 4 feet wide, about 12 feet in depth, 3 feet 6 inches in the clear on top, and a foot and a half on the bottom. It just gives the cattle a chance to go through without turning around. We put about 9 feet of water into that vat and then on the top we measure at

first about an inch of oil, and after a few cattle—say 10 or 15—are run through, oil is added at the rate of approximately a gallon to each bullock. We find that a bullock will carry off a gallon of oil. Where the cattle first come into the vat we have a false drop. It descends about 2 feet below the oil and water surface, and the cattle step over and cover the abdomen and parts where the ticks usually invade the cattle, and then after they swim to the middle of the vat we have another false drop. They start to climb up and make another drop, insuring a second immersion in the oil. At first we used hot water, but it broke up the oil into smaller globules. Now we use cold water, and of course the oil remains thick on top, and this has proved very effective. I do not think it is as effective—of course it can not be—as a full oil dip; but if we inspect the cattle and find any more ticks we run them through again.

We usually do the dipping in the evening. Shade is an absolute necessity in the dipping of cattle with oil. We usually dip them in the evening and very slowly, because if you dip fast the oil will mix with the water and it becomes necessary for the oil to rise to the surface again in order to get the mechanical effects of the oil. This dipping has proved very beneficial in our State. I think our oils are just as effective as the Beaumont oils. We have secured results in the destruction of ticks with oil.

We have in a number of counties public dipping vats. We go to the county boards of supervisors, who run the affairs of the county, and when we have a district badly infected with ticks, where there are a number of small ranches, where it would be too expensive to put in dipping vats of their own, and we ask them to put in a vat out of the county funds, and we have been successful. On a great many ranches there are private dipping vats. On smaller places they are not so large, but at the same time they are effective.

I believe that the float dip, in places where you can not use the full oil, and in some places where there are oils that are pretty hard on cattle (some of the heavier grades of oil containing asphalt I believe do the damage to cattle), is a very good substitute for the full oil dip.

The CHAIRMAN. I would like to ask Doctor Payne if he has experimented sufficiently with the new oil that he has been trying to throw any light upon the subject, or if he has carried the tests far enough to justify a report.

Doctor PAYNE. The number of cattle which have been treated or greased with the oil of which you speak—the Kentucky crude oil—has not been sufficient, and results are not sufficiently known, for me to render an official report as to what the results are.

The CHAIRMAN. As far as you have gone it has been satisfactory. has it not?

Doctor PAYNE. Yes; in a few individual cases where we have had an opportunity to see the cattle and examine them, we can not see any difference between the Kentucky crude petroleum and Beaumont oil. This Kentucky oil is a grade of oil from which the lighter grades, such as naphtha and kerosene, have been extracted. It seems to have lots of asphalt in it, but so far as we can tell at the present time the results of using it have been very satisfactory where it has been properly applied.

Doctor PARKER. I do not consider this final as regards the safety and practicability of this dip. This is merely a preliminary report.

Doctor MAULDIN. How much ought each animal take out of the dip?

Doctor PARKER. We have no way of estimating it.

Doctor CURTICE. We have been told that the waste is large where there are large numbers of cattle. We have not discussed yet the cost of disinfection in its various phases, and it comes up to us in the East with great severity when we consider the small numbers of cattle and the fact that they are scattered. In one county in North Carolina we have tried disinfection. The great lesson taught here has been that the work in the West has been under supervision. In the East we have usually permitted the owners of the cattle to do it, and they have failed; but in Yadkin County we have had some supervision. We furnished the oil, the pump, and the outfit to do the work, got the cattle and treated them, turned them loose, and reinspected afterwards. We did everything. To apply one disinfection it took the services of the inspector, with living expenses; we may count that at not less than \$7. It took a team to haul the outfit; we can put that down at \$3 more. It did take a second inspector, but we could have used a laboring man. Then there were two laboring men at \$1 each. The driver, who was only hired to drive, was paid 50 cents for extra labor, making \$2.50. The feed for the horses and dinners for the men would add \$1.50 at least. I estimate, therefore, that it would cost us about \$15 for such a day's work. I asked the inspector how many head he treated daily, and he said from 7 to 15 a day. That seems pretty expensive. With large herds the expense becomes less. We have found that the inspectors need not go once in three weeks, but probably once in four. It appears that before the dipping will clean the herds the expense will be equal, in most cases, to that of abandoning the pasture on September 1, and then putting the cattle on next spring, although reinspection next spring will have to determine the fact. To offset against that expense of dipping we have to consider the continuous rounds and the prospective rounds next year. In the long run those expenditures for continuous inspection add up greatly. I believe that we can make pasture, sow

grass for an area, pick up the loose cattle, and give them back to the owner fattened cheaper than we can disinfect them in any other way.

Mr. MORRIS. I think they pay too much up there. We do differently in Oklahoma. The only expense is the expense of the inspector. The owner is notified to have his oil on a certain day and have plenty of help. The inspector goes and supervises it. The man who owns the cattle pays for the oil and for the help. He is told he can do it or pay additional sheriff's expenses, as the latter will buy the oil and will furnish the help. But when a man sees he is up against it he would rather do it himself.

Doctor PARKER. Have you had a test case of putting the sheriff in charge?

Mr. MORRIS. No, sir; we can also claim that no man has ever tried. A man came in about a month ago to one of the best lawyers in town. There were some \$7 expenses against him. The lawyer came to me and said, "How about this?" I showed him the law, and he said, "I will tell him to pay the bill."

Doctor CURTICE. I should amend my last statement. I would not advise the method for all cattle, but for certain of those that we were convinced we could not hold in quarantine cheaply otherwise—for the tag ends and clean-up.

Mr. DEAN. I think it is very plain that the same conditions do not prevail in all portions of the country. It has been demonstrated all along the line during this discussion that we could not, with any degree of certainty, agree on a rule that will apply to every condition. We must let every inspector in charge of a district adopt the rules best suited to his district and his people. We think we are following that best suited to our people in the open-range and large-pasture areas.

Doctor NIGHBERT. Doctor Curtice did not mention the expense of making the first inspection without disinfection of cattle or the premises. In the States of Georgia, North Carolina, and Virginia it will cost, at a rough estimate, 20 cents simply to inspect those cattle, let alone the disinfection, for the same reason that the gentleman has mentioned—the cattle are scattered so much. We must keep looking through the brush for the cattle, and you can not visit eight or ten premises a day. If a law were made to force a man, after you find the cattle, to disinfect, that would reduce the expense to the simple cost of inspecting and teaching a man how to disinfect his stock.

DIFFICULTIES OF WORK ALONG STATE BOUNDARIES.

Doctor CURTICE. There are some questions about interstate work that usually come up that we can discuss to advantage here. I am not getting far outside when I call attention to the line between North Carolina and Tennessee and Georgia. It used to bother us six, seven,

or eight years ago, and it still bothers us. I will cite a condition: A little village lies on the State line; the country is peopled by a good many residents who have single cows that they take out to pasture on either side of the town. People come and go; the pastures are infected in one county, and no effort is made to clean them up. An effort has been made to clean up in a county to the south, and yet when they came to the obstacle of cattle coming from the other State they ceased vigorous operations, so that the conditions remain about what they were at the beginning. This is true of the line between North Carolina and Tennessee, and, I believe, between Tennessee and Georgia. The methods of dealing with such cases might be discussed here. Of course we know that it depends on what the people want to do; yet I have an idea that a wire fence along the State line might help some portions, if it were feasible.

The CHAIRMAN. I want that question discussed very much. We are bordering on Alabama and Tennessee and North Carolina. Doctor Payne, Doctor Nighbert, and myself have had a good deal of trouble with this interstate-line proposition. It was the greatest menace we had to our work this year; I think Doctor Payne will bear me out in that. We have Fannin County almost rid of ticks under State provision. When Doctor Payne took charge of the force in our county tick-eradication work he asked me about Fannin County, which adjoins Tennessee. I told him I thought Fannin County was practically free of ticks. He put inspectors to work in the lower part of the county, and found it almost entirely free of ticks; also the middle part. But right up next to Tennessee he found a great deal of infestation, perhaps a mile wide and 2 miles along that line. There was Polk County Tenn., continuing to infest Fannin County, Ga. We did not have an inspector watching the northern part of the line, because we did not want to get into trouble with interstate business. He sent his inspectors up there and they found ticks, and he quarantined nearly all the Georgia cattle in Fannin County; put them in close quarantine. The Tennessee cattle continued to come over and eat at their pleasure, and our people got tired of it. They said: "Why, here, Doctor Payne, you are forcing us to put our cattle in quarantine, and we have not said anything; but you must keep Tennessee cattle off our grass, too." Then, I think, the Doctor appealed to the authorities of Tennessee; anyhow, the result was not satisfactory. The cattle continued to come over, and we objected, and I wrote to the commissioner of agriculture a strong letter, and stated what we were going to do. We said, "We are going to take those cattle up and pen them up." We did not do it, however, because we were a little afraid to. Doctor Payne sent his inspectors up there, and the offending cattle seemed to be mostly milch cows, and they belonged mostly to women, and they did raise some objections, because their living was involved. To make a long

story short, after we had about made up our minds to pen up those cattle and put the Georgia law to them, Tennessee stopped work on the 1st of November and withdrew the inspectors.

Doctor ELLENBERGER. There is more done there now than in the early season. The State and county inspectors worked in there not to exceed a month.

The CHAIRMAN. But about the 1st of November you withdrew them?

Doctor ELLENBERGER. We did not work there. The State of Tennessee did about a month's work there.

The CHAIRMAN. Here we have been working for about three or four years to clean up that county, and that infection got in there, and it took one of your special men, Doctor Payne, to come down there and find it out. We have got the law in Georgia, but when Tennessee itself withdrew that local inspection we felt that we could not do anything else; but we did not want to get up any feeling, so Doctor Payne and the State authorities just agreed to withdraw for the present. I would like to know just how to proceed. I think, without any instructions, that Georgia is going to insist next year on quarantining all cattle that come in from Tennessee. Tennessee is commencing above and working down and shoving the ticky cattle upon us. We have to have a starting point and work down, too, so that is the trouble that has confronted us in the State. Where Doctor Payne has not had those conditions to contend with, in the western part of the State—in Stephens, Habersham, and White—I think he will recommend a provisional quarantine. We have had success in that part of the State; but in Fannin County, until Tennessee cleans up, Georgia is hopelessly at the mercy of those ticks above us. Fannin County needs just a little cleaning up in the northern part. We did not want to divide the county, because there is no natural line we could adopt. Besides we find cutting a county in two is very distasteful to the people. You must cut out a whole county unless you have some natural line. We did do that in Rabun County. Fannin County is waiting on Tennessee; there is Gilmer, there is Murray to the west of us, and there is Dade and Walker and Catoosa that we could clean up next year; but unless Tennessee gets busy and cleans up that part of the State that adjoins us, we are at their mercy. I would like to have a solution of that matter, and would like to hear further from Doctor Payne or Doctor Nighbert if I have not stated all the facts in the case.

Doctor ELLENBERGER. You people seem to think we do not have troubles in Tennessee. We have the same conditions you have in North Carolina and Georgia. There is Polk County; there is the Cumberland Mountain country. The people have their cows and yearlings, maybe two or three. They may not own a square foot of

ground. It is a pretty hard matter to handle them in many instances. This summer we had no way of taking care of certain classes of territory. The best we could do was to inform those people that they must not have ticky cattle, and it was too late in the season to be positive that that territory would be free of ticks next spring; but if we were able to keep those cattle off the range after September 1, then we would have a fair chance of having the territory free of ticks next spring. The only way to succeed then is to work Polk, Bradley, and James counties of Tennessee at the same time that Fannin and Murray and Whitfield of Georgia are being worked. Earlier in the season it was soon found that the State authorities in Tennessee would not turn over their men to the Bureau to direct the work from the same office. For that reason it was decided that the State people—three deputy inspectors—would take up the work in certain counties, and the Bureau force would take up the work in other counties, and then this fall, along toward the end of the season, we would investigate the counties that the State people thought they had ready for exemption. I think the deputy State inspectors in that county work were employed possibly four weeks, but they really accomplished very little more than greasing the cattle one time.

At the time Doctor Payne called my attention to Polk County it was too late to accomplish disinfection this year, because it was away along in September, the 26th or 28th. It was entirely too late; the cattle had been dropping the ticks on the surrounding country. It takes some time to get people interested and have them make arrangements to take care of the cattle, so that all we could do was to get them interested and get ready for work next year. We find the same trouble in Lincoln County, Tenn.—that is, in the southern portion of the county. There are some little farmers in there; a small portion is fenced. What is under fence is cultivated; cattle run outside, and those people have quite a good many yearlings. If it had not been for the yearlings, I think we would have succeeded in getting the territory practically disinfected this year. It is too hard a matter to get them up and grease them. Our inspectors have a great deal of difficulty in finding these young cattle. When they find them, they have a great deal of difficulty in finding the owner. That, of course, made it difficult for our inspectors to report the names of the owners of the cattle they found. Maybe sometimes several days elapsed before they found out whom the cattle belonged to. If we could have disposed of the young cattle there, and managed to get to each owner and see his cattle and instructed him that he must keep them greased and clear of ticks, as we could not permit them on the range if ticky, I think we would have gotten pretty good results there. It was too late in the season to call attention to the fact that it would be necessary to dispose of

the yearlings, but we hope to give everybody to understand that they must dispose of the cattle they can not take care of. But many of the people have no place to care for the cow; they have to depend on the range, and it is a hard proposition.

TROUBLE WITH OX TEAMS.

Doctor PAYNE. The chairman has stated the correct conditions prevailing down there. There is one thing we have to contend with which is not general in any other part of the tick-infested district, and that is the steer-team proposition. The farmers and stock owners in some counties in Georgia rely almost solely upon steer teams for hauling purposes, and that is a very serious thing, and it is a hard thing to combat. To rob a man of his means of transportation deals a serious blow to him, and I do not feel able to state to a person that "you can not move your ox team." It shuts a man off from his market and in a great number of instances it prevents him from making a living. I simply mention it as one of the things to be considered in the mountain counties in north Georgia.

The CHAIRMAN. Those steer teams are not depended on in the whole State. You must not get that impression. We have a nest of those mountain counties that prefer steers to mules. They raise mules and sell them and use the steers, because it is cheaper, I suppose; some people are able to buy a steer team, but are not able to buy the other teams. After we get through with this tier of counties we are now engaged in, and if we can get three or four counties on the west, we will be out of the steer-team proposition. There are no steer teams after you leave the next tier of counties. We are in the last tier of counties where they use steer teams. You do not find them in middle Georgia and rarely in south Georgia, except for lumbering purposes, or something of that sort. I think we are fighting the hardest battle. I think Doctor Payne has had the hardest battle in the whole territory. After next July, if we are successful now, I think we will have the tick proposition solved in Georgia, if we can continue the work. We will be down into the counties where we have stock laws.

Doctor KEANE. I can appreciate the difficulties which you must have in a great many of these States. We are very fortunate out West—that is, in the State I represent; but do I understand that the ox teams are infested with ticks? I can not see how it would work any hardship upon the parties who own these infested ox teams to prohibit their moving while infested, because it is no more trouble to clean them than it is to curry horses.

The CHAIRMAN. I do not think so either, but they differ with us.

Doctor PAYNE. It is not as hard to clean the steer teams as yearlings, but if you allow them to go over the temporary quarantine lines others are going to take the same liberties whether you grant them or not, and it is setting that precedent and allowing steer teams to go over temporary quarantine lines which gives citizens and persons in the district a chance to violate the quarantine restrictions.

The CHAIRMAN. We are managing that fairly well. Doctor Payne with his three very efficient veterinary surgeons is right behind the whole business, and I think it is remarkable that we have done as much as we have in the four short months. The people are falling right in line, and as we go down the interest is increasing, for they know that a calf just below the line is worth \$4 and above the line \$8; and the best men, the representative men, make those statements at public meetings and say it is true, and the people are becoming educated. I believe the educational feature in this work is the most important part. We get our people together and talk these matters over; we show them the life history of the tick, and prove to them that it is a menace not only to the cattle industry, but to the whole county or State. They are becoming converted, and they are willing and anxious to take hold of this work; but we must, as stated before, heap line upon line and precept upon precept, and continue educating. I do not think we should become discouraged at all, but, on the other hand, I think we should look at it optimistically and never let up, do our work thoroughly, be encouraged, and encourage others.

I am satisfied that Georgia will, with one more year's good work and a little more money, clean up the tick. I believe with Secretary Wilson that, if they will give us time and plenty of money, we will sweep the ticks into the Gulf of Mexico.

REMARKS BY W. H. DUNN.

Mr. W. H. Dunn, of Tennessee, being present on the afternoon of the second day, was called on by the chairman for some remarks.

Mr. DUNN. I used to be in this work, and I am still a friend to the cause. I am fully in accord with this movement and shall be glad to do or say anything whatever that I can to help. The trouble has always been to educate the people as to what ought to be done. They thought we were trying to run something over them, but I am glad to say that the feeling has changed, and I do not think there is a farmer of any prominence or of standing in any community who is not in full accord with the work in Tennessee. It ought to be carried out by the State and by the people to the fullest and strictest letter of the law, and I am heartily in favor—and I said so to-day before the resolutions committee at our meeting of the farmers' institute—of the State of Tennessee making a liberal appropriation, so this work can be carried out. It has been hampered and handi-

capped by not having sufficient means. I do not know in what way the State of Tennessee could spend its money any better than in helping this cause. I do not know any State that could have better cattle than we can have here. We need State aid.

PLANS, METHODS, AND PROSPECTS FOR TICK ERADICATION IN TEXAS.

By JOSEPH W. PARKER,
Inspector, Bureau of Animal Industry.

The State of Texas contains nearly half of the southern cattle in the United States and about two-thirds of the State is below the quarantine line against splenetic fever. The portion of the quarantine line in Texas is over 500 miles long, has eleven bordering counties on the east, and passes through three counties. Nineteen entire counties and parts of three others above the quarantine line are partly infested with fever ticks.

At the time of the establishment of the live-stock sanitary commission of Texas (1893), the most profound ignorance existed among the generality of cattlemen as to the nature, cause, and method of transmission of splenetic fever. The isolation of the plains, the lack of any previous State oversight of the health of live stock, and the necessities of a frontier country had fostered in the pioneer a contempt for scientific discoveries and a spirit of disregard for the law whenever it best suited his convenience and immediate financial interests. Advice based on scientific knowledge concerning the so-called Texas fever was scoffed at and disregarded with the lofty contempt of "an experienced cowman." So it came about that the work for the control of splenetic fever has been fiercely opposed, the rules and regulations of the State and of the Federal Government disregarded with impunity, and the appropriation for the support of the State live-stock sanitary commission made astonishingly inadequate. The very fact that a purely nonveterinary commission was established and has been so maintained for thirteen years reflects the dogmatic spirit of the Texas cattleman and the Texas legislator.

In the face of these odds the State commission and the Bureau of Animal Industry have for thirteen years maintained an educational campaign, until, aided by nature's own illustrations of the soundness of the "tick theory," and the advancing plowshare, very few people in the counties bordering on the quarantine line or above it have any doubts as to the correctness of the doctrine. With the settling up of the country, too, has come a more civilized regard for the law because it is the law. Smaller margins of profit in all lines have enforced more scientific methods of reducing avoidable losses, so that the prevention of splenetic fever has become a matter of individual concern and

study. Public sentiment is aroused in half of the partially infected counties west of the quarantine line, and is awakening everywhere. This, while not showing the rapid progress that might have been made, is substantial progress. At least four counties—Collingsworth, Childress, Kent, and Garza—that were among the partially infected counties eight years ago are now free from infection. Three more—Cottle, King, and Hardeman—we expect to show free from infection, or nearly so, by June 30, 1907, if even a small force can be kept in the field to keep the cattle owners at it until they have done a thorough job. This has been brought about by ranch management directed to that end, dipping vats, and the aid of natural conditions. The four counties first named are on the border of the Territory, where occasional seasons present conditions that the fever tick can not survive—such as severity and length of winters, dry summers, general sparseness of grass and brush, and lack of permanent surface water. A very little systematic effort, with nature's assistance, did the work. The fact that these four counties have been freed of ticks demonstrates the feasibility of the proposition.

As we advance eastward toward a more favorable environment for the tick, the methods employed for its eradication must be more nearly perfect. But nature and the cutting up of the large pastures into farms, with consequent reduction of the number of cattle, their increased value, and the increase of tilled acreage, contribute to help us solve the problems of tick eradication in Texas.

Naturally, it is logical that tick eradication should be first undertaken in the partially infected counties above the quarantine line, where public opinion is prepared and conditions are most favorable for success. This gives nineteen counties and parts of three counties for a field of actual work. Three distinct conditions in tick eradication are presented in this area: (1) Unfenced range; (2) fenced ranches; (3) farms.

Fortunately the unfenced range comprises only a small part of this area, viz, parts of Pecos, Terrell, and Brewster counties, and small scattered areas in other counties. Some half dozen unfenced ranches in Pecos and Terrell counties and one in Brewster County are infected to a slight extent. This involves some 400 to 600 sections of land. I already have assurance from most of the ranchmen concerned that they will put in dipping vats and unite in an effort to eradicate the ticks. The plan favorably regarded is to run drift fences, throw the cattle on certain parts of the range long enough for the other portions to become tick free, then dip the cattle and keep them on the clean range. This will require a year at least. Climatic conditions may be counted on to offset many of the imperfections in the application of this method on an open range. The presence of a great number of sheep on these ranches is a distinct advantage.

In the fenced ranch country I class the counties of Reagan, Irion, Sterling, Upton, Glasscock, Mitchell, Howard, Stonewall, Jones, Fisher, Scurry, Borden, Haskell, King, Knox, Cottle, and Foard. In these counties the ranches yet preponderate over the farms, though Jones, Fisher, and Haskell are being rapidly settled. Hardeman and Wilbarger counties may almost be classed as farming counties, but the preponderance of infection is of course on the larger pastures. The ranches and farms are so intimately associated that the same inspectors do the work and the same methods are used, except that "doping," or hand treatment, is encouraged on the farms. The ranchmen are almost unanimous in the counties of Cottle, Hardeman, Foard, Wilbarger, King, and Knox in their desire to eradicate the ticks and very seldom have we met with opposition that persuasion has failed to overcome. As soon as it became evident that a concert of action could be had the opposition vanished, lumber was ordered for dipping vats, and dipping commenced as rapidly as possible. As far as practicable dipped cattle have been placed on tick-free pastures. In other cases, dipping will be repeated as necessary. Owners of small lots of cattle on farms and in towns have nearly all promised to "dope" their cattle; many have done so, some under supervision. The cattle on farms will be placed on wheat fields or other premises free from ticks, after being themselves freed of ticks. We will show good progress in these counties. - Our inspectors in these northern counties of the State are now reinspecting premises previously found infected, reporting what has been accomplished, and advising the owners what further work will be needed.

In Haskell, Stonewall, Jones, Fisher, Howard, Mitchell, and Glasscock counties fewer ranches have dipping vats, and the people have had little experience with any dip or application except hand applications of Beaumont oil obtained from railroad supply, of which they are afraid. They have heretofore been permitted to drive their ticky cattle to certain stations for shipment as southern cattle, or from pasture to pasture, without much restraint. The result was that a great many cattle died last season of splenic fever—probably an average of 500 in each county. All the shipping stations except Big Springs are infected. Many of the public roads and trails are infected. Public opinion favors tick eradication, but the people are afraid to use Beaumont oil. They do use it, however, when their cattle are dying, but seldom repeat the dipping or doping often enough to eradicate the ticks. Our inspectors are developing considerable influence, but it will be a work of two years or more to educate these people up to the point of doing their work thoroughly.

No work has yet been done in the counties of Fisher, Borden, Irion, Reagan, and Upton, and very little in Stonewall and Pecos counties.

In Sterling and Irion and southern parts of Jones and Fisher counties the inspection, though general, is not permanent. Their normal outlets for shipping are San Angelo, Abilene, Merkle, and Sweetwater, below the quarantine line, and Colorado and Iatan above the line. In these vicinities 50 to 90 per cent of the cattle are infected, but not over 25 per cent are immunes. Heavy losses occur annually. The estimated losses, by counties, for 1906 are—Jones, 500; Fisher, 500; Sterling, 1,500; Irion, 500. Shipping stations at Colorado, Iatan, and Eskota, and trails thereto from the south and some of those from the north, are infected. There have been heavy losses all along the trails, and adjoining pastures are infected. A movement is now on foot by Sterling County cattlemen to ask that Sterling and Mitchell counties be placed below the quarantine line. It is not probable that this movement represents any large portion of the cattle owners in Sterling County, and it certainly represents but very few in Mitchell County. I believe that the temporary damage arising from the enforcement of the law as it applies above the quarantine line will be greatly outweighed by the permanent benefits that will result. This territory is not permanently infested to an extent that the cattle are immunes, and so these counties really belong above the quarantine line.

In Terrell County the Big Canyon Ranch, 8,000 cattle, 160,000 acres, fenced, is the first to begin tick eradication, having a pasture vacated by cattle May 8, 1906, used for sheep since that date. They will put in a dipping vat and dip the cattle to be placed on this pasture, thus vacating another pasture. Other infected fenced ranches of the locality will begin work this winter by the same method.

Investigations are now being made in Upton and Reagan counties. It is probable that these counties are not extensively infected and that good results will be apparent in six months. As their natural outlet is by way of the shipping stations above the quarantine line, they must dip ticky cattle before they can ship them. This insures tick-eradication work in these counties. Owing to the immense area already covered by the force at work in Texas, we have not undertaken work in Throckmorton and Baylor counties, though the effect of the educational campaign is apparent there.

Three State inspectors have assisted in the investigations. The legislature will be asked for an emergency appropriation to enable the live-stock sanitary commission to increase its force of inspectors.

The Bureau force engaged in tick eradication in Texas at present numbers eleven men. Employees are mounted and usually ride two together, following round-ups as far as practicable. In the Colorado vicinity it was found necessary to use hacks to carry bedding and supplies, but this was not advantageous in other localities. In doing the "follow-up" work we expect to dispense entirely with the hacks.

I began work at Quanah, Tex., organizing the force at that time consisting of six men, under Mr. William D. Jorden. They rode two and two and visited ranches when round-ups were in progress. At other times they worked on ranches and had personal interviews with the owners, persuading them to get busy. The results will be shown later. In case we found an infected shipping station, we have had no serious opposition in enforcing the treatment of the cattle with Beaumont oil, so that I believe we will show these shipping stations and small towns in that part of Texas clean. They are clean now to all appearances, having been inspected, reinspected, and treated twice. I have no doubt we will show them clean next season, unless they introduce infection by driving in infected cattle. The same method is being inaugurated on the Texas and Pacific Road, because our shipping stations must be clean to afford an outlet for clean cattle.

Next I organized a force at Colorado, Tex., under Mr. Dan McCuningham. There were four men on that force a part of the time and all the Texas inspectors helping. They have a different kind of country to go through. They can not go on horseback, because they can not depend on the ranches to accommodate even two men offhand. Their horses must be fed, and those ranches do not keep feed for horses. Again, they might find themselves a long distance from any ranch headquarters when meal time or sleeping time comes, so the time lost would be a great deal; therefore we thought it best to rig up a ranch hack, tent, and camping outfit. Two men would go to one pasture and two to another, or one man would go to a round-up, just as circumstances indicated. When cattle are being rounded up by the owner one inspector can do a thorough job, and we take advantage of that fact. When we go into the farming country along the Texas and Pacific, which we intend to work during the bad weather, the men will leave their hack in town. One man has been placed in Stamford, in conjunction with the Texas inspector, and another at Hamlin, near by, to take up the work in Fisher and Stonewall counties. These two can work together if they find it advantageous. We have one other man in Sanderson.

The first essential to successful continuation of the tick-eradication work in Texas is the enforcement of the law against the movement of infected cattle above the quarantine line. For this purpose I would ask that the Federal and State inspectors be distributed so as to afford the most prompt inspection when persons desire to move cattle, and so as to detect violations of the law and secure evidence for prosecutions. The second condition of success is that a sufficient number of employees be kept on tick eradication to keep the work constantly going. If the force should be entirely withdrawn much of the ground that has been gained would be lost within a month or two. The one condition of securing the active cooperation of the ranchmen and

farmers is to show them that it pays. We seldom have difficulty in doing that.

The following table shows the work we have done, and, in part, the results:

Condition of tick-eradication work in Texas.

County.	Free from ticks.			Infected.			Number of dipping vats. ^a
	Premises.	Acres.	Cattle.	Premises.	Acres.	Cattle.	
Childress.....	23	54,260	7,875				
Cottle.....	6	25,420	4,140	4	154,600	10,700	4
Hardeman.....	190	160,572	17,596	39	80,038	6,004	6
Foard.....	5	98,440	10,035	10	68,940	16,335	7
Wilbarger.....	40	28,290	1,399	36	75,500	9,007	8
King.....	9	846,800	50,400	3	19,640	2,800	1
Knox.....				7	124,020	13,450	4
Jones.....	14	5,972	424	29	1,066,082	14,452	2
Haskell.....	3	6,100	809	12	140,020	13,450	1
Stonewall.....				4	16,350	1,364	0
Howard.....	7	22,090	1,767	2	33,280	3,480	1
Mitchell.....	3	19,840	1,450	17	55,424	23,175	20
Glasscock.....	5	48,780	3,475	4	42,880	2,550	3
Sterling.....	10	37,040	2,079	46	252,349	17,143	10
Pecos.....				1	96,000	6,000	
Terrell.....				5	325,760	14,200	2
Brewster.....				1	32,000	2,000	
Total.....	315	1,349,564	101,448	220	2,582,883	156,110	69

^a Includes those already in and those definitely planned.

Mr. Jorden estimates that 100,000 cattle have already been dipped in his territory. Very little dipping has been done in other localities, with the exception of Stamford. Estelline, Acme, Damsite, Chilli-cothe, and Stamford, which were infected when we began work, have been freed of infection by hand applications of Beaumont oil under the supervision of inspectors. We expect to make uninfected shipping stations of Colorado, Iatan, Hamlin, and other stations, in the same manner, beginning work on them this month.

Investigations are complete in King, Hardeman, Cottle, and Childress counties. The following ranches are believed to be now freed of ticks: White & Swearingen, Cottle County, 100,000 acres, 7,000 cattle; T. B. Yarbrough, Cottle County, 25,600 acres, 3,000 cattle; Fred Fleming, Cottle, Foard, and Hardeman counties, 82,000 acres, 6,500 cattle; other premises—Hardeman County, 10 premises, 19,820 acres, 1,285 cattle; Wilbarger County, 25,000 acres, 5,000 cattle; Mitchell County, 2,020 acres, 235 cattle; total, 254,440 acres and 23,020 cattle, which are clean or may be reasonably expected to be clean. Besides these, the work in progress, on which we have at present no method of knowing results, may be expected to free a great deal more of infection. Lack of thoroughness by the owners will inevitably result in some failures, and unforeseen circumstances will cause others. As the work was only begun September 1, it is, of course, impossible to say that any territory has been actually demonstrated to have been freed of infection so as to justify the removal of

quarantine restrictions, nor will this be possible to determine prior to June 30, 1907, or later. These estimates of the results accomplished are based on the conditions found and the work actually done.

REPORT ON ARSENICAL CATTLE DIP FOR TICKS.

By JOSEPH W. PARKER,

Inspector, Bureau of Animal Industry.

Beginning in July, 1906, in cooperation with the live-stock sanitary commission of Texas, which furnished the material for the experiments, I have been testing an arsenical dip proposed by Dr. N. S. Mayo, chief veterinarian of Cuba, for the destruction of cattle ticks. Doctor Mayo's formula and directions for making and using the solution are substantially as follows:

Arsenic trioxid, commercial	8 pounds.
Sodium carbonate, crystallized	24 pounds.
Yellow soap	24 pounds.
Pine tar	1 gallon.
Water sufficient to make	500 gallons.

Dissolve the arsenic in 20 to 30 gallons of water by boiling 30 to 40 minutes. Add water to make 100 gallons. Dissolve the soda in 20 to 30 gallons of water; dissolve the soap (shaved) in the soda solution; pour the tar into this in a fine stream, stirring at the same time. Mix the two solutions. Add enough water to make 500 gallons.

Doctor Mayo has used this only as a hand application, and reported that it killed all ticks without injury to the cattle, even in the extreme heat of Cuba.

On July 31 and August 3, 1906, near Converse, Tex., I sprayed cattle with this preparation and with a modification made by leaving out the soap, and made subsequent observations to determine whether the preparation will kill all ticks, and whether the soap can be dispensed with, as we know that the use of soap in a dip is impracticable in that locality. The cattle—calves, yearlings, cows, steers, and bulls—were in good condition and heavily infested with ticks.

Lot 1, 10 mixed cattle, sprayed July 31. Soap left out of the solution.

Lot 2, 16 mixed cattle, sprayed July 31. Full Mayo solution.

Lot 3, 25 mixed cattle, sprayed August 3. Soap left out of the solution.

The solutions were not well made, as considerable insoluble brown sediment was found in the vessel in which it was prepared. The water is supposed to have contained iron. Light showers fell on lots 1 and 2 about ten to twelve hours after spraying.

Observations.—August 3, most of the ticks on lots 1 and 2 were dead. Ticks in second molt seemed to survive most frequently, though living ticks of all ages were found. Cattle very slightly stiffened. Skin slightly crisped on the surface. August 7, lots 1 and 2 yet showed a few living ticks, mostly in second molt, but a few ovigerous females

seemed uninjured by the application. One living seed tick found on the brisket of a cow of lot 2, but it was unattached. Cattle no longer stiff. Injury to skin consisted in slight crisping of the skin, superficially. The spray without the soap seemed fully as efficient as with it, no differences being observable. Lot 3 on August 7 showed results parallel with observations on lots 1 and 2 on the third day. I was prevented from making further observations by press of other work, but considered the observations final as far as the use of the solution with the spraying machine was concerned. On August 15, Mr. L. C. Roosevelt, the operator of the spraying machine, and Mr. Adolf Real, the owner of the cattle, carefully examined some 30 head of these cattle and could find no live ticks.

On September 25, near Quanah, Tex., 3 cows and 2 calves, in good condition, moderately infested with ticks, were dipped in an arsenical solution made according to the following formula:

Arsenic.....	8 pounds.
Sodium carbonate.....	24 pounds.
Tar	1 gallon.
Water sufficient to make.....	500 gallons.

A concentrated solution for 1,000 gallons of dip was prepared by dissolving the arsenic (double the above quantity) in about 60 gallons of water, then adding the soda, and when no sediment was perceptible the fire was drawn and the tar added. One cow was held in the vat a minute.

On observation sixty-eight hours afterwards 50 per cent of the ticks had disappeared; of the remainder, 75 per cent were dead. The hair and skin were perfectly normal. One hundred and seventeen hours after dipping all ticks were dead; calves were slightly burned on the abdomen and brisket; cow that was held one minute in the dip was slightly burned. None of the cattle showed any symptoms of arsenical poisoning. Animals in first-class condition. The observations were made by Mr. William D. Jorden and Dr. Vernon A. Dennis, of the Bureau force.

Other cattle were dipped in November under supervision and found free of ticks within eight days, as follows:

Fred Fleming, Foard County.....	5, 000
J. J. McAdams, Foard County.....	2, 000
Early Brothers Foard County	1, 000
Millard Young, Foard County.....	35
J. J. McAdams, Cottle County.....	3, 000
M. M. Hankins, Hardeman County.....	500
W. R. Wheat, Hardeman County.....	100
Total.....	11, 635

Mr. Givens Lane, a Bureau agent, supervised the dipping of these cattle and made the subsequent examinations. In his report on the

dipping of the McAdams cattle he says: "I did not examine a single cow but what the ticks were either dead or in a dying condition, say, after three days." He found no living ticks after eight days, and no injury to the cattle.

In connection with the dipping of the Wheat cattle, 2 cows were dipped in a double-strength solution without injury to them. Mr. M. M. Hankins, live-stock sanitary commissioner, Quanah, Tex., says of these:

After twenty-two hours, upon examination, the cows were not injured in the least. The male ticks were dead. The large female ticks were very much swollen and had a bluish appearance. The small ticks were practically all dead. The only casualties attending the dipping were two steers dead, and in my opinion they died from drinking the solution which had been carried out by the cattle into the pen, where the cattle stayed over night, and the cattle during the night evidently drank from the puddle of the solution.

In making the dip for these dippings a zinc pan holding about 120 gallons was used, the arsenic and soda being placed in it together and boiled until dissolved, the tar added, and the mixture diluted to the strength desired. No dripping floor was used. At one dipping the vat contained ice and no bad result was noted.

Beginning about November 15, Swenson & Co., Stamford, Tex., dipped 886 ticky cattle and placed them on feed. Doctor Dennis had an excellent opportunity to observe the results. He reported November 26 that on examination that day he was unable to find a single living tick. I helped him examine these cattle November 20, finding a very few living ovigerous female ticks and they plainly showed that they were in a dying condition. Inclement weather prevented his making another satisfactory examination until November 26. It apparently required longer for the ticks to be killed at Stamford than at Quanah, the difference being probably due to the water used or to the manner of preparing the dip. At Stamford the arsenic and soda were dissolved separately, being boiled by steam, then mixed, and not subsequently boiled. Or it may be that the capacity of the vat at Stamford was not correctly estimated and the dip was consequently too weak.

The dangers to be apprehended from the use of the arsenical dip are those resulting from careless preparation of the dip and from improper disposition of the residue in the vat when it becomes necessary to clean the vat. As the dip can be made in concentrated form, 50 gallons to make 500 gallons, the first of these dangers can be overcome. The second danger can be guarded against only by supervision and instructing the users as to a safe method of disposing of the residue.

RESOLUTIONS.

The committee on resolutions offered the following, which were unanimously adopted:

Representing the States of Alabama, Arkansas, California, Florida, Georgia, Kentucky, Louisiana, Missouri, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, which are more or less infested with the cattle fever tick, and which are suffering great annual losses in consequence thereof, having met in convention to discuss the work accomplished in tick eradication by the United States Department of Agriculture, in cooperation with the proper officials of the several States above named; and

Whereas the most conservative estimates of the direct annual loss resulting from the presence of the said fever ticks amounts to the sum of \$40,000,000 annually; and

Whereas the expense of the entire eradication of the said fever tick in the United States will be far less than the direct loss resulting from the same in any one year and will result in a permanent saving of this great sum of money to the cattle interests of the United States; and

Whereas we realize the necessity of a progressive campaign for the eradication of the cattle tick; and

Whereas Congress at its last session appropriated the sum of \$82,500 for the prosecution of the work during the current fiscal year; and

Whereas the Federal Government is asking the cooperation of the various States whose interests are so vitally affected; and

Whereas very beneficial results have been obtained by the expenditure of the sum appropriated by Congress, and the entire eradication of the cattle fever tick is only a matter of continued intelligent effort and an expenditure of a sum of money, very small compared to the great annual loss resulting from these ticks: Therefore, be it

Resolved, That we heartily commend the action of the last Congress in making the said appropriation of \$82,500.

Resolved, That we recommend to Congress the appropriation of \$250,000 asked for by the Secretary of Agriculture, to be used by the Bureau of Animal Industry of said Department in continuing this work of tick eradication in cooperation with the proper officials of the States concerned during the coming fiscal year, and we further recommend that of this amount \$50,000 be made available for immediate use, so that this important work will suffer no interruption.

Resolved, That we urge upon the members of the legislatures of these States the importance of having the necessary laws to empower their State officials to enter into said cooperation, and the necessity of a sufficient appropriation of money to carry on their part of the work.

On motion of Doctor Cary, a unanimous vote of thanks was tendered to Hon. James Wilson, Secretary of Agriculture, and Dr. A. D. Melvin, Chief of the Bureau of Animal Industry, for their earnest work along the line of tick eradication and for their efforts to secure the appropriation of funds for this object.

Doctor Keane offered a resolution, which was unanimously adopted, expressing appreciation of the work of Dr. R. P. Steddom, chief of the Inspection Division of the Bureau of Animal Industry, and his force of inspectors, and pledging support to the work.

On motion of Professor Willoughby, a vote of thanks was tendered to Major Wells, custodian of the building in which the meeting was held, and to other authorities, for courtesies extended in the use of the court room and offices.

REMARKS IN CONCLUSION.

The CHAIRMAN. I am optimistic as to tick eradication in Georgia. I know that we have had some ups and downs, but all of you have had the same. I am satisfied that if Doctor Payne is sent back to Georgia with an increased appropriation, we are going to rid twelve or fifteen counties of the tick. You have encouraged me, and I shall go back home and tell our people that this is the greatest work that Georgia could engage in, and I believe every word of it. We want more cattle. We must have better lands and fewer ticks. We shall never be a prosperous State—none of our Southern States will prosper—until we grow more cattle. We have grown cotton until we have nearly exhausted our land. The West must look to the South for some cattle. We must get ready for this. There is no long grass growing free in the West. You can not start with a bunch of cattle in the Dakotas and drive them to Chicago, taking six months in the driving, and expect them to be fat when they get there. Already Armour and Swift and the other packing houses are looking for more cattle. We have the climate, but we have too much cotton and not enough cattle. If the Government will help us to rid our country of this cattle infection, we will show you the grandest country that the sun ever shone on:

Let us put our shoulders to the wheel and push, and back up the great work that the National Government has done for us. We must do our part. They have done their part nobly, and I feel ashamed that my State has not done more in this tick eradication work than it has in the past, but if we meet twelve months hence you will find that Georgia has not made a small appropriation.

Doctor DAWSON. I believe it would be well for this assembly to appoint a committee to confer with the Agricultural Committee in the coming Congress.

Professor WILLOUGHBY. Further extending the remarks of the gentleman as to the National Government helping the States that help themselves, most of this should be considered as a national problem in the same way that foot-and-mouth disease was considered a national menace to our country, although it was localized in New England, and the same way that scab and other diseases in the West, which might have spread all over our country, were considered a national problem and were taken up by the National Government. So, in the same way it seems to me that the Northern States—all States of our Union—should be perfectly willing to engage in this national problem of tick eradication. It not only affects the Southern States directly, but it affects every State in the Union.

At the meeting of the Southern commissioners of agriculture last fall at Richmond, Va., a committee of five members was appointed which did excellent work in presenting the claims of our people to the

Southern Congressmen and Senators. I have not heard that the members at Jacksonville have continued that committee, and it seems to me that if we should adjourn without appointing such a committee there would be a division in that respect.

The CHAIRMAN. I think you are quite right. I know the question was up at Jacksonville before the commissioners of agriculture, and they very heartily indorsed the work and asked for an increased appropriation. They urged their Congressmen and Senators to ask for this increased appropriation. I am not advised as to whether they appointed a committee. I think it is very necessary to appoint a committee to act in conjunction with that committee. Or if they did not appoint a committee we should act alone. I would like to hear some discussion on that line or some suggestions. I think Mr. Willoughby's idea is right.

Doctor KEANE. I believe we should all resolve ourselves into committees of one and use our influence with our Representatives in Congress and try to have them do the same with northern members in Congress. It will do more good than any committee.

The CHAIRMAN. That is all good work. I, with Doctor Redding, represented Georgia before that Congressional committee last February, and we had representatives from a great number of States. They heard us, and I think it was through our work with that committee that we got that appropriation. As Doctor Keane says, let us all go back home and appoint ourselves committees of one to see our Congressmen. I know last year I wrote to every Congressman we had, and I had a favorable reply from every one except one, and that one did as much to get the appropriation as any of the others. I think if every man will do that it will be effective.

On motion of Doctor Klein a unanimous vote of thanks was extended to Mr. Wright for the able manner in which he presided over the meeting.

The meeting adjourned.

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